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TIMBER RESOURCES OF WESTERN SOUTH DAKOTA

Alan W. Green

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Forest Service
U.S. Department of Agriculture
Ogden, Utah 84401

RESEARCH SUMMARY

Reports findings of the comprehensive survey of western South Dakota's 1.4 million acres of forests, which include 1.2 million acres of commercial forest land. Presents statistics on area, volume, growth, mortality, and timber use. Also describes species, volumes per acre, stocking, site quality, ownership, trends in product harvesting and other factors that bear on timber management. Opportunities and problems related to future development are discussed.

THE AUTHOR

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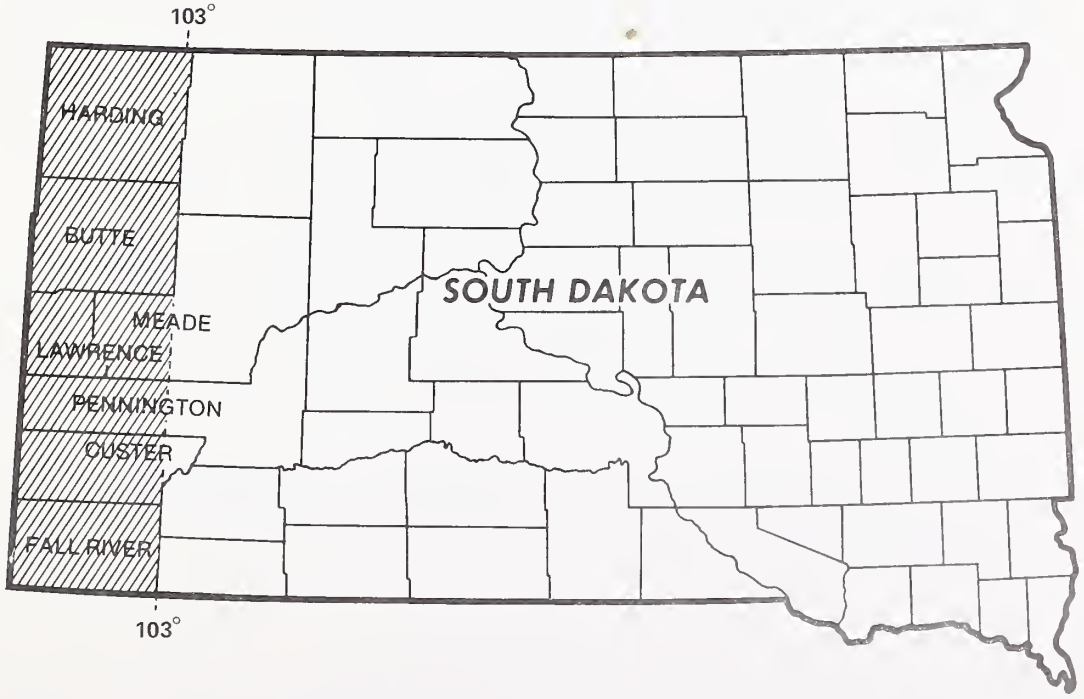
FOREWORD

This report presents basic statistics on western South Dakota forest area, timber volume, growth, mortality, and removals. It also discusses the outlook for future timber supplies from State and privately owned forest land.

The area covered in this report includes all of Harding, Butte, Lawrence, and Fall River Counties, as well as all lands west of the 103rd Meridian in Meade, Pennington, and Custer Counties. Timber statistics for South Dakota reported by Choate and Spencer (5) were for the entire State and so cannot be compared directly with data reported here.

Data are from timber inventories conducted from 1971 to 1974 by the South Dakota State Department of Game, Fish, and Parks, Division of Forestry; and the Rocky Mountain Region, Forest Service, in cooperation with the Intermountain Forest and Range Experiment Station, Forest Service, Ogden, Utah.



A 2-MINUTE SUMMARY

- There are 1,246,800 acres of commercial forest land in western South Dakota; 63,200 acres less than in 1970 (7).
- Most of it is in public ownership, but farmers hold over 154,000 acres, 70,000 acres less than in 1960.
- Land productivity is relatively low, but climate and soils make good tree growth possible. Average annual net growth is 32 ft^3 per acre per year.
- There are 1.6 billion ft^3 of wood, 5.6 billion bd.ft. (International 1/4-inch rule) of sawtimber. Pennington, Lawrence, and Custer Counties have the most timber.
- Mortality is low, but increasing due to greater insect activity.
- Because of prolific regeneration and resultant dense stands, an intensive thinning program is required to keep stands in a productive condition.
- State and private lands have the potential to produce in excess of 12 million ft^3 per year. Only about 192,000 acres are presently operable, with a potential output of 8.5 million ft^3 per year.
- Planned output for State and private lands is about 6.2 million ft^3 per year from the operable area. In order to assure wildlife, grazing, recreation, and esthetic goals are achieved, managed stands will have fewer trees than would be required to maximize timber output.
- Removals from National Forest and private ownership have increased since 1970.
- Maintaining markets for small size material and management money are key items for achieving planned goals and objectives for western South Dakota's forest resources.

SIGNIFICANT CHANGES

- The area of commercial forest land is 63,200 acres less than reported in 1970 (7).
- Commercial forest land owned by farmers is 70,000 acres less than in 1960 (4).
- Growing stock volume and sawtimber volume increased 6 million ft^3 and 2.2 billion bd.ft., respectively, since 1960 (4).

Sampling techniques, revised land classification, and changes in land status account for much of the reduction in area. The loss of farmer-owned CFL is due, in large part, to withdrawals for nontimber uses.

The increases in volume are due, in part, to growth rates in excess of removals over the period and, in part, to changes in sampling techniques used in more recent inventories.

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A BRIEF HISTORICAL FLASHBACK

Any discussion of western South Dakota forests is primarily one of the Black Hills. This 4,500 square mile uplifted granite, limestone, and metamorphic rock island in the Great Plains is a major geographic landmark of the United States, attracting hundreds of thousands of visitors each year (12). These visitors are more likely to look at the Black Hills as a suitable setting for Gutzon Borglum's transformation of Mt. Rushmore than an important source of timber. But although the area is heavily used for recreation, significant values are derived from the water, wildlife, livestock grazing, and timber associated with the forest.

The values of the timber and related resources of the Black Hills have been recognized for more than a century. Before 1870, these were the hunting grounds for Plains Indians. The ponderosa pine forests were subject only to the vagaries of nature and to fires set by the Indians to drive game. As a consequence, the stands of timber were generally sparse or open (10).

With the discovery of gold and the subsequent opening of the area to white settlement came significant changes in the use and nature of the forest. The timber resources were exploited for mining and the attendant construction of houses and other buildings, and later to supply timber needs for construction of railroads (3,10). Fires continued to go unchecked. Concern for what was happening to the resources of the Black Hills led to much of the area being set aside as a forest reserve in 1897. That reserve later became the Black Hills National Forest.

The increased density and vigor of the timber, consequences of protection and management of the forest since the turn of the century, are clearly seen in the remarkable comparative photographs taken from the same locations in 1874 and 1973.[1]

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[1]Photographs courtesy of Agricultural Experiment Station, South Dakota State University, Brookings, South Dakota.

The 1874 photographs were taken by William H. Illingsworth during a 60-day expedition into the Black Hills to gather extensive information about the terrain and resources. The expedition of some 1,200 troopers of the 7th Cavalry and assigned civilians was under the command of Lt. Col. George A. Custer, elevated to the rank of Brevet Major General for the occasion (10). Custer and his command left Fort Lincoln for the northwestern edge of the Black Hills July 2, 1874. Two years later (June 26, 1876), he was to die in the battle of the Little Bighorn.

The "today" pictures were taken by Richard H. Sowell, South Dakota State University, for Dr. Donald R. Progulske during a study to show man's impact on the environment and resources of the Black Hills. The Progulske publication (10) is a delightful and most informative look at the history and development of the Black Hills.

General Custer's 1874 encampment near Dearfield, looking up Silver Creek, near the confluence of Castle Creek....

...and in 1973 (above). (Below) another 1874 view of the same encampment area...

...and in 1973.

TODAY'S FOREST

The Size of It

About 20 percent of the land area is forest...

and 91 percent of the forest is classed commercial.

There are nearly 1.4 million acres of forest land in western South Dakota. Over 1.2 million acres are classed as commercial forest land (CFL), suitable and available for timber-growing activities. About 11,000 acres of productive forest land are reserved from cutting because of uses that preclude timber harvesting. Most of this land is in Mt. Rushmore National Memorial, Wind Cave National Park, and Jewel Cave National Monument.

Land Class	*Area (Thousand acres)*
Commercial timberland	1,246.8
All other forest land:	
Productive reserved	11.1
Other reserved	1.3
Other forest nonreserved	108.1
Total forest land	1,367.3
Nonforest land	5,511.5
Total land area	6,878.8

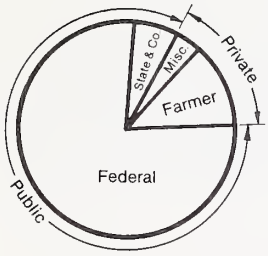
Most of the noncommercial forest land is relatively unproductive; either the site conditions are unfavorable for economic production of useful wood, or the sites are occupied by kinds of trees not commercially useful.

Who Owns It

Over 80 percent of the commercial forest land is publicly owned or administered:

The bulk of the CFL is publicly owned.

Owner Group	*Area (Thousand acres)*	*Percent of Total*
Public:		
Federal	961.0	77.1
State	67.0	5.4
County and municipal	3.4	0.2
Subtotal	1,031.4	82.7
Private:		
Forest industry[2]	--	--
Farmer	154.6	12.4
Misc. private	60.8	4.9
	215.4	17.3
Total	1,246.8	100.0



The Forest Service has the most CFL.

The principal owner is the Forest Service. Its 952.5 thousand acres represent 76 percent of the total and 83 percent of the publicly owned commercial forest land. The biggest part of its holdings are the Black Hills National Forest in Pennington, Custer, Meade, and Lawrence Counties with minor areas in Fall River County, and small areas of the Custer National Forest in Harding County.

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[2]Forest industry data have been combined with miscellaneous private data to avoid disclosure of an individual owner.

The Bureau of Land Management administers most of the other federally owned commercial forest land.

Other publicly owned land belongs to the State, administered and managed through the State Department of Game, Fish, and Parks, Division of Forestry. Its biggest single holding is Custer State Park.

Collectively, private individuals own more CFL than any owner except the Forest Service.

Privately owned commercial forest land is dominated by small private owners, largely farmers, who collectively control 154,000 acres, or 12 percent of the total and 72 percent of all privately owned commercial forest land. This is 70,000 acres less than reported for 1960 (4). These holdings are rather evenly distributed throughout the seven counties.

How Productive Is It

Some poor soils and exposed bedrock reduce the average productivity of the land.

Compared to other important timber producing areas in the West, the commercial forest land in western South Dakota is not highly productive. Only about 3 percent of the land is capable of growing as much as 60 ft^3 of wood per acre per year.

Shallow soils with low moisture-holding capacity are common. Also, there are many areas where exposed bedrock prevents the establishment of trees. In such areas, stands tend to be sparse-to-open, and over a given time period cannot produce the amount of wood possible with more dense stands.

But the land is well suited for growing crops of timber.

But although the productive capacity of the CFL is limited, the area is well suited to timber culture. As Boldt and Van Deusen (3) point out, "This basic premise is neither speculative or theoretical--its validity has been demonstrated by actual forest responses to nearly a century of consumptive use."

Timber Kinds and Sizes

Ninety-four percent of the CFL is growing ponderosa pine.

Were it not for some 24,000 acres of spruce type (mostly in Lawrence, Pennington, and Custer Counties), the softwood (evergreen) forest would appear to be a single species, ponderosa pine (*Pinus ponderosa*). As a forest type, it occupies nearly 1.2 million acres of the CFL.

Hardwoods are not a significant resource for timber purposes.

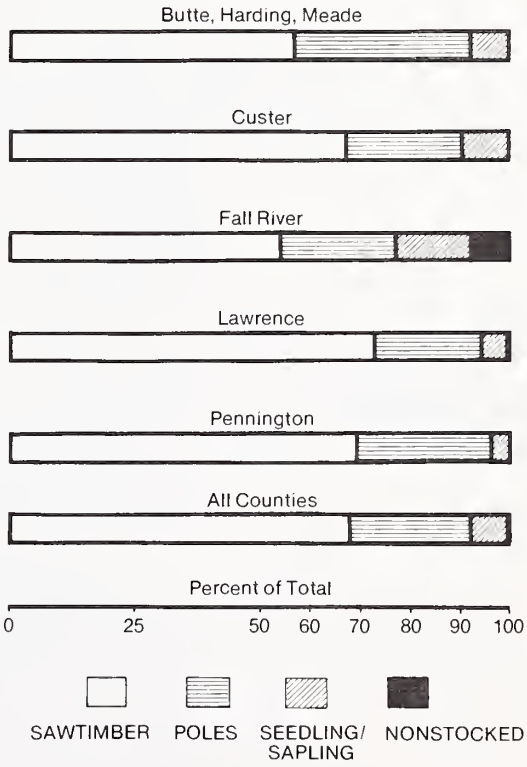
Hardwoods (broadleaf species) cover only about 50,000 acres and include localized pockets or small stands of aspen (*Populus tremuloides*), as well as a mixture of oak and other species in the hills, and considerable cottonwood (*Populus deltoides*) along major streams and rivers.

Two-thirds of the CFL area is occupied by sawtimber stands.

Sawtimber stands dominate the commercial forest land in all counties. Although Custer, Lawrence, and Pennington Counties have the most sawtimber stand area, Lawrence County has the highest proportion of sawtimber and none of the counties has less than 50 percent of the CFL in that size class.

This does not mean there are no small trees in these stands. Stand-size classification can be misleading in terms of the diameter distribution simply because of the way stand sizes are defined[3].

Percent of commercial forest land by stand-size class.



[3]Softwood sawtimber trees need be only 9.0 inches d.b.h. (hardwoods, 11.0 inches); sawtimber stands need have only half the total stocking in sawtimber and poletimber trees, with sawtimber at least equal to pole timber stocking.

Only 8,700 acres are classed as nonstocked.

There is little nonstocked area and most of it is in Fall River County. This attests to the ease with which natural regeneration becomes established following harvesting activities.

How Is It Used

Visitors won't find grizzly bears or wolves...

The grizzly and the grey wolf are gone and the black bear and mountain lion are rarely seen. But, there is abundant wildlife to be seen by the hundreds of thousands of people who annually visit the Black Hills.

but they may see some 60 varieties of other animals, as well as birds and fish.

Deer, elk, wild turkey, antelope, beaver, buffalo, and even Rocky Mountain goats and Big Horn sheep can be found. Many of these animals and birds have been introduced or reestablished over the past 50 years or so (12). In the streams and lakes, fishermen find several varieties of trout, most of which have been introduced and maintained by the State.

Outdoor recreation is the dominant use of much of the forest today. Management of the forest is designed to integrate recreation opportunities, esthetics, protection of wildlife habitat, and production of usable wood. Tree harvesting is a necessary part of maintaining wildlife habitat and a varied landscape, as well as a healthy forest.

Major nontimber uses of the forest include outdoor recreation.

The diverse recreation opportunities of the Black Hills National Forest are used at the rate of about *2 million* visitor-days annually. Much of the recreational activity is in developed sites for camping, picnicking, and boating. However, about 70 percent of the present use is for dispersed activities such as hiking, hunting, and sightseeing, the most common activity (12).

Livestock grazing, though sometimes a controversial issue, is a controlled use on the Black Hills National Forest during the summer. In 1975, 26,900 cattle and horses and 4,700 sheep grazed over 125,000 animal unit months on the National Forest (12).

THE TIMBER RESOURCE

How Much Wood

Although only about 1.6 percent of the total wood volume in the Rocky Mountain States is in western South Dakota, it is an important resource.

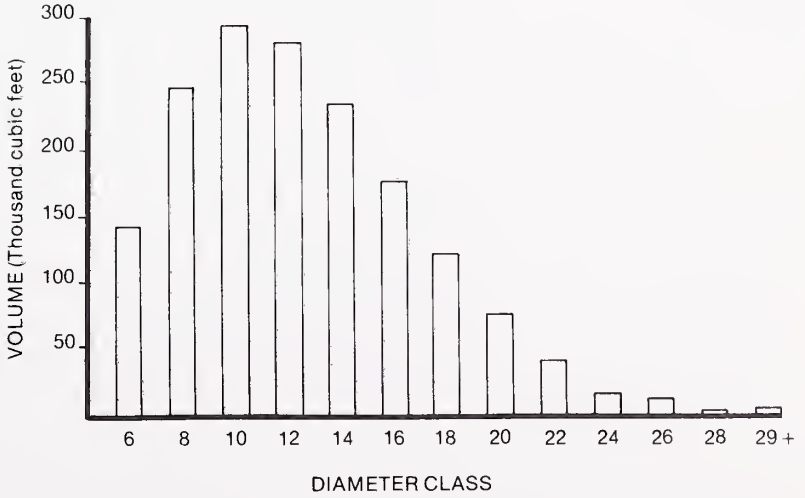
In 1974, CFL in western South Dakota contained an estimated volume of 1.7 billion ft^3, 1.6 billion of it in growing stock trees, most of it softwood timber. About 1.25 billion ft^3 are in sawtimber size trees (9.0 inches d.b.h. and larger for softwoods and 11.0 inches for hardwoods), estimated at 5.6 billion bd.ft. (International 1/4-inch rule), 2.2 billion bd.ft. more than in 1960 (4).

Custer, Lawrence, and Pennington Counties are the most heavily timbered.

The bulk of the standing volume is in Custer, Lawrence, and Pennington Counties, the latter having the most, 589 million ft^3. Lawrence County accounts for about half the hardwood volume (8.6 million ft^3). Nearly 73 percent of the cubic foot volume is in trees less than 15 inches d.b.h.

Nearly three-fourths the volume is in trees less than 15 inches d.b.h.

Volume by diameter class



Growth — Mortality

Net annual growth is higher than the average of the Rocky Mountain States.

In spite of the low productivity of the forest land, relative to the rest of the Nation, growth of timber in western South Dakota is above average for the Rocky Mountain States. Gross annual growth is about 43.7 million ft^3 or 35 ft^3 per acre. That is about the average for the other States. However, a low estimated mortality rate (3 ft^3 per acre compared to 11 ft^3 for all the Rocky Mountain States and about 9 ft^3 for the Nation), results in a net annual growth of growing stock of 32 ft^3 per acre, 8 ft^3 more than the average.

Ninety percent of the growth occurs on 90 percent of the CFL...

About 90 percent of the net annual growth is in Custer, Lawrence, and Pennington Counties, about the same proportion as CFL area, but that does not mean all the counties are equally productive:

but growth rates vary by county.

County	*Average net annual growth (ft^3/A/yr)*
Butte, Harding, Meade	32
Custer	28
Fall River	21
Lawrence	36
Pennington	34
All counties	32

Insect activity is increasing in some areas...

Recent increases in mountain pine beetle activity indicate that current tree mortality is probably somewhat higher than that found during the last inventory. Hardest hit seems to be Lawrence County, but no current accurate estimate of the amount of damage is available. There is a real need for damage survey in areas of most severe infestations.

and mortality may be underestimated in terms of current conditions.

Western red rot and other fungi have caused substantial volume losses in older stands (8). But, the continuing conversion of older stands to faster growing young stands will significantly reduce the impact of these diseases as well as that of insects (3).

It should be noted also that in contrast to ponderosa pine areas in other parts of the West, the Black Hills ponderosa pine is free of dwarf mistletoe (1, 3).

Snowbend and windthrow losses vary from year to year, but currently are the third ranked cause of mortality. Snowbend and breakage occur more often in sapling and small pole-size stands; windthrow is a more common hazard to large pole and small sawtimber sizes (3).

Removals

A record high volume of 17.9 million ft^3 was cut in 1974...

In 1974, 17.9 million ft^3 of roundwood products were harvested (11), two-thirds of which were saw logs, amounting to 76.7 million bd.ft. (International 1/4-inch rule). The remainder, about 6 million ft^3 were pulpwood, poles, posts, and fuelwood.

but, 700,000 ft^3 were left as logging residues.

Removals from growing stock were 17.7 million ft^3 (or 44 percent of net growth) and about 0.114 million ft^3 came from dead trees. The latter represents only about 0.2 percent of the salvable dead volume and 9 percent of the annual estimated mortality.

Seventy-five percent came from National Forests, the rest from private land.

Three-fourths of the total output came from National Forest and almost all the rest from private land. More than half the total came from Lawrence County.

Output from all lands is expected to increase.

The estimated output for 1977 (appendix tables 10 and 11) is about 19.7 million ft^3 if present trends continue. That would represent an increase of 31 percent over 1970.

Sawtimber removals are expected to total 82 million bd.ft. for saw logs and account for about the same proportion as in 1974. "Other removals" associated mainly with land withdrawn from timber use, are expected to account for about 1 percent.

PROSPECTS FOR FUTURE WOOD SUPPLIES FROM STATE AND PRIVATE LAND

The future timber supplies from western South Dakota will be influenced by (a) the management goals of the owners or managers of the resource; (b) the potential of the land to grow wood; (c) the condition of the existing resource; and (d) the amount of money available for silvicultural treatment.

The major supplier will, of course, be the Black Hills National Forest. The planned cut through 1986 is in excess of 36 million ft^3 per year (5). *Because the bulk of the remaining CFL is in State and private ownership, the remainder of the report will examine the timber resource on those lands, an area of about 242,000 acres, excluding Custer State Park.*[4]

Potential Versus Available Output

State and private CFL has the potential for producing about 12.4 million ft^3 of wood annually.

Potential output of timber is a function of land productivity and the level of management or silvicultural practices applied to the timber resource (5). Given current and prospective future on-site costs for silvicultural treatments, State and private lands have the capacity of producing 12.4 million ft^3 per year under a management program of a precommercial thinning at 10 years, commercial thinnings every 20 years, and a final harvest at the end of a 110-year period. Stand density would have to be maintained between 120 and 140 ft^2 of basal area per acre.

Even if achieving the potential were considered desirable, that level of output would be impossible to reach at present...

That output could be reached only if *(a) the entire CFL area were operable; (b) the forest resource were managed strictly for timber production; (c) the forest were fully regulated, and (d) sufficient funds were available for on-site cultural activities when needed.*

because not all the land is operable...

The fact is, however, nearly 20 percent of the CFL is now considered "*inoperable.*" Along with a prudent logging operation that would protect the soil and other associated resources, steep slopes and other conditions make harvesting and management impossible or unwise with present harvesting techniques.

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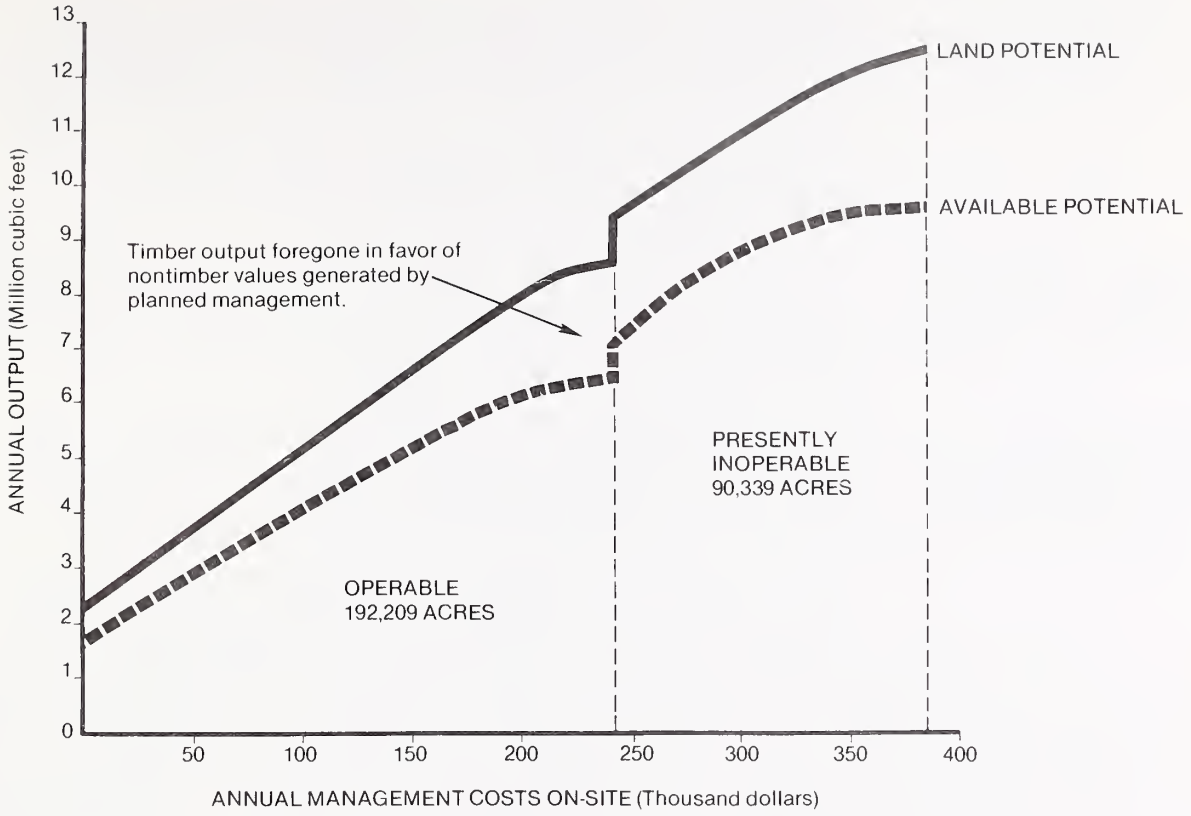
[4] Custer State Park is excluded from much, but not all, of the more detailed examination of the resource that follows. Although timber will be harvested from the Park, such removals will be requirements to enhance the other values and meet the overall management goals of the Park, rather than representing any specific timber production goal.



Potential output and available output, State and privately owned CFL, western South Dakota.

and more management money is needed.

There are over 30,000 acres of dense young stands needing thinning. The State has placed these lands in the inoperable category because present and prospective future (short term) management money available is insufficient to realistically include them in its management plans. (The Black Hills National Forest has a similar situation; such lands are included in the Marginal land component).

To grow the potential of the operable area would cost about $245,000 a year.

At current costs, potential output on the operable area is estimated at 8.5 million ft^3, and would cost $245,000 annually for on-site management activities. For the 192,000 operable acres, this would amount to about $1.28 per acre per year.

Managing the currently inoperable area will cost more.

Should the entire 90,000 acres of inoperable area become available for harvest and management, an additional 3.9 million ft^3 of wood could be produced annually at an estimated additional cost of $140,000 or $1.55 per acre per year. The likelihood of this happening is small, however.

Management plans propose levels of output less than the land's potential...

The State Division of Forestry has timber management plans for each county. Because its forestry program includes technical and financial assistance to private owners and coordinated programs with other public agencies, these plans include a proposed target timber harvest for all

non-Forest Service lands. The timber management objectives outlined in these plans are much the same as the Forest Service's multiple use goals. Timber is considered to be an important available commodity to be grown and utilized along with other commodity and noncommodity goods and services. Therefore, there is no intention to assume a management posture to maximize timber output on State-owned land or to recommend such a program to private owners.

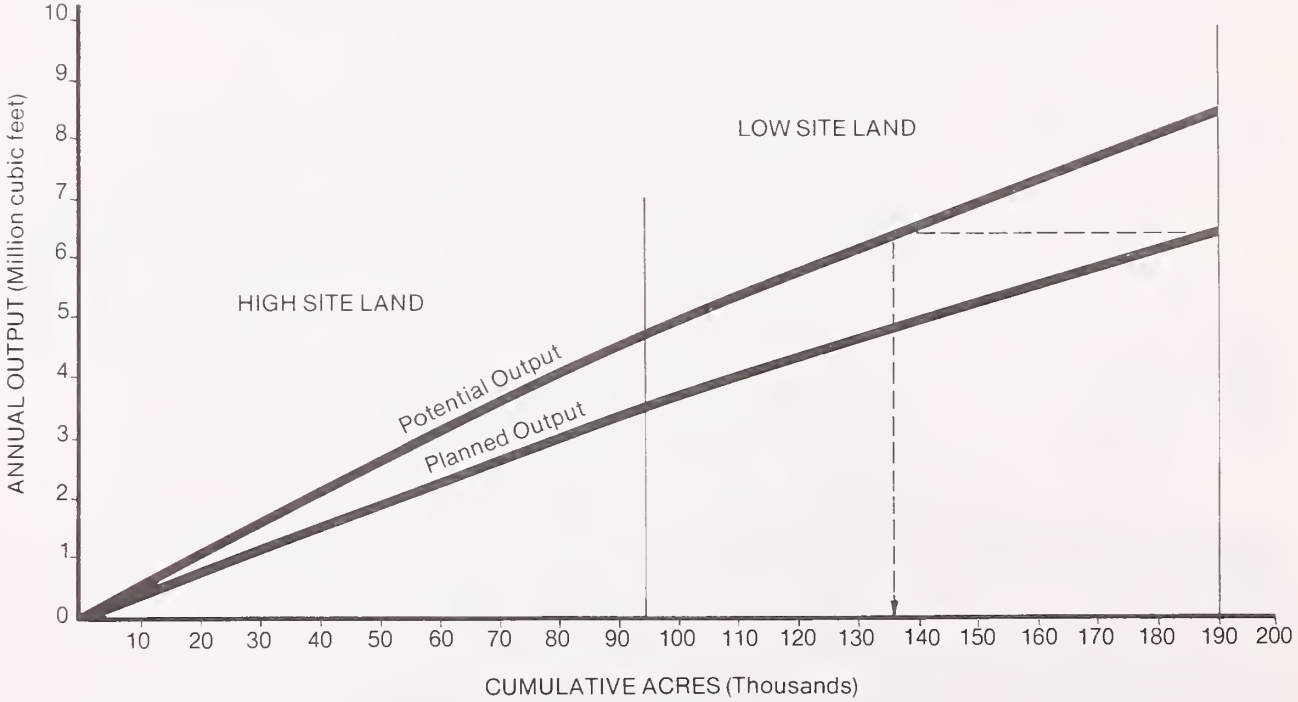
to favor other forest resources and values.

Maximizing timber output would require stand densities nearly twice those planned. Only with a more open forest can the nontimber objectives for livestock range, wildlife habitat, water production, esthetics, and other recreational uses of the forest land be achieved.

Planned output could be achieved by intensively managing fewer acres...

Available Output -- The difference between potential and available output (planned for period following achievement of full regulation) indicates the trade-off between timber and the nontimber values achieved.

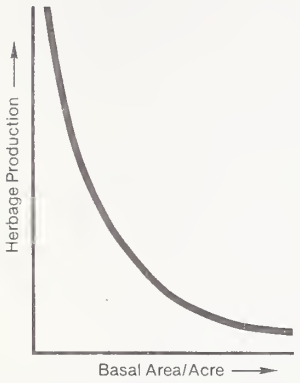
Because of uncertainty as to whether private owners will in fact act in accordance with plans, the "available output" has to be considered as the probable upper limit.



Potential and planned output for operable area, State and private lands.

but the overall management objectives would not be met.

Looking again at the potential and planned output, by intensively managing all the high-site land now operable and an additional 42,000 acres of low-site land, the total planned output could be achieved. In other words, only 136,000 acres would need to be intensively managed rather than 192,000 to get the same annual output. This would result in a savings of about $66,000 annually. But, in terms of overall management objectives, that would be a false saving.



The 56,000 acres of unmanaged land would not provide the water, wildlife, range and esthetic value objectives; nor would the intensively managed areas. Why? Because maximizing timber output on the 136,000 managed acres would require stand densities so high that good wildlife browse and herbage production would not be possible. The unmanaged areas would soon grow into such densities that they would provide about the same nontimber values as the high density, managed stands and little timber. They would also look worse.

To achieve the planned potential output of timber and nontimber values, the manager must begin with existing timber and nontimber resources.

Achieving the available potential timber output is not just a matter of scheduling intermediate cuts and harvesting. There are specific conditions that exist now, with respect to timber stands and to the forest in general, that need to be examined. The manager must begin with the current timber resource and manipulate it during the next few decades in a manner that will result in a timber resource of a kind and condition that will allow both future timber and nontimber goals and objectives to be met.

The Existing Timber Resource

Softwood timber stands are relatively young...

Stand Age and Size -- Although there are some stands as old as 240 years, the bulk of CFL is occupied by stands in the 50- to 130-year class, with heaviest concentration in the 50- to 100-year-old class.

Nearly 60 percent of the CFL is occupied by sawtimber stands:

but over half are sawtimber size.

Stand size class	*Area*	*%*	*Cumulative %*
Old growth sawtimber	21,493	9	9
Young growth sawtimber	116,601	48	57
Poletimber	62,129	26	83
Seedling-sapling	36,629	15	98
Nonstocked	5,424	2	100

Even though such a large proportion of the CFL is classed as sawtimber, board foot volumes per acre are relatively low; 96 percent of the area is carrying stands with volumes less than 10,000 bd.ft. per acre. The board foot-cubic foot ratio of 4.4 indicates that the average size of trees in these stands is relatively small.

Ninety-eight percent of the CFL is stocked with trees...

Stocking -- Only 5,400 acres (2 percent of the total) are considered nonstocked. No doubt part of the non-stocked area is unable to support trees and its burned sections lack sufficient seed to naturally restock such areas within a reasonable period.

However, having 98 percent of the CFL area classed as stocked doesn't mean there are just the right number of trees nor that only good trees are included. Eleven percent of the area actually capable of growing trees is either bare or is occupied by cull trees:

but some acres have too few trees, some have too many.

Stockable area	*Area occupied by* *Growing stock trees*	*Cull trees*	*No trees*[5]
	Acres		
211,482	188,110	3,490	19,882
% of total	89	2	9

Both situations are equally unproductive for timber.

An acre 60 percent stocked with growing stock trees is considered to have an adequate number of trees. About 33,000 acres of CFL are less than 50 percent stocked with live trees and some 64,000 acres are less than 60 percent stocked with growing stock trees. An estimated 40,000 acres have more growing stock trees than are needed to use the site effectively.

Inadequate stocking is tough to deal with except over a longer time frame.

The latter condition is somewhat easier to deal with in a short time frame. A thinning program can bring overstocked stands into a more productive condition rather quickly and is consistent with other management goals. Understocked areas are not so easily dealt with, especially small treeless areas scattered through the forest. Over time, many such areas will "grow" into a more desirable condition and better utilize the site. They can also be planted, but at considerable cost. Planting, however, is much used to restock larger areas without a sufficient seed source.

Much of the CFL will be under some even-aged management system, with a two-cut shelterwood harvest to regenerate the stand.

Stand Density and Structure.--One of the objectives of the State's planned forestry program is to bring the State and privately owned CFL under full management and full regulation within 30 years through its public assistance program. Although many kinds of silvicultural treatments can be used (depending on the nature and condition of existing unmanaged stands), most will take advantage of the tendency of ponderosa pine to establish itself in even-aged stands. Intermediate harvest every 20 years with a two-cut shelterwood regeneration cut at final harvest is the system generally thought most appropriate for ponderosa pine in the Black Hills (1, 3).

[5]This area represents open areas in sparse stands in which trees could grow.

Average stand density is about 80 ft^2 of basal area per acre...

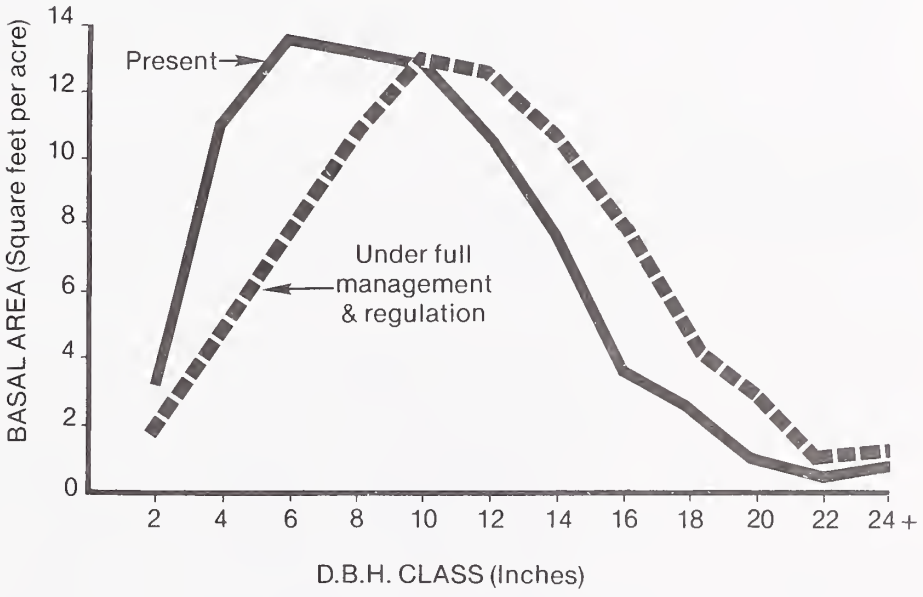
Once the acreage of CFL is all under management, it would be occupied by individual stands of different ages and tree sizes. On a per-acre basis, the average of all these stands would have a density of about 80 ft^2 basal area distributed among the diameter classes as shown by the dotted line.

but, there is more in small-size trees than desired.

Currently, the average of all stands (some managed and some not), is about 80 ft^2 of basal area but distributed by diameter classes as shown by the solid line.

The apparent imbalance in basal area distribution indicates both the existence of stands needing thinning and the fact that the forest is not yet in a fully regulated condition.

Square-foot basal area by diameter class for the average acre.



When fully regulated, only 30 percent of the total basal area will be in trees less than 10 inches in diameter.

In a fully regulated situation where a variety of roundwood materials (pulp, poles, and saw logs) are product objectives, the basal area in trees less than 10 inches d.b.h. should be about 40 percent of that in trees 10 inches d.b.h. and larger; or, 30 percent of the total basal area (6).

Currently the average stand has 40.6 ft^2 basal area (about 50 percent) in trees less than 10 inches d.b.h.

A continued thinning program, emphasizing removal of smaller trees, is needed.

Removing more of the smaller diameter trees (thinning from below) automatically will increase average stand diameter. Normal tree growth, during the period between thinnings will increase the diameter of residual trees and, therefore, the basal area in each diameter class.

Nontimber benefits achieved through timber management activities stretch the nontimber resource management dollars.

Fewer but larger trees will be the result and will create a more open forest capable of meeting both timber production and other management objectives. In addition, maintaining the vigor of young stands will help control mountain pine beetles and reduce mortality losses.

Heavy thinning in stagnated stands can produce some startling results.

As an example of what thinning stagnated stands can do, Boldt (2) reported in a case study in 1970 some startling results of a sequential thinning effort. A 70-year-old stand containing 2,000 trees per acre, with an average diameter of 4.2 inches was thinned from below to 476 trees, then 7 years later to 105 trees. The result: in an 11-year period, removal of smaller trees increased diameter growth of remaining trees, and a stagnated sapling stand was transformed into a small sawtimber stand averaging 9.1 inches d.b.h.

Such a thinning program may not always be prudent, however, because of the susceptibility of residual trees to damage from snow or wind. A series of lighter cuts is usually recommended to reduce the likelihood of such losses (3).

There is a good case for thinning investments.

How good is an investment in precommercial and commercial thinnings? Although the forest land is not as productive as that of other timber-producing areas in the West, there are opportunities for generating both timber and nontimber values.

The major silvicultural requirement for growing timber is stocking control. The average cost for precommercial thinning in young stands is about $60 per acre. On an average site, a management regimen consisting of one precommercial thinning and three commercial thinnings to a growing stock level of 80 ft^2 would generate a total output of some 4,600 ft^3 per acre over a 100-year rotation. That is about 30 ft^3 per acre per year more than if no thinning were done. Also, an additional 20 cents per acre per year worth of forage would be produced. There are several ways to look at and interpret such an "opportunity."

If the annual harvest could be increased at the same rate as volume growth...

First, if there is sufficient old-growth sawtimber reserve, the "allowable cut effect" would indicate that an additional 30 ft^3 per year could be harvested for each acre brought under such a management regimen. Assuming a stumpage value of $0.25 per ft^3, that represents an increase in income per acre of $7.50 per year, in addition to the annual income from grazing estimated at $0.20 per acre per year.

If the rotation were 110 years and the thinning were done at 20 years, there are 90 years in which the grazing income and the additional wood values would be captured.

the rate of return on the $60 thinning is about 11 percent.

The rate of return on the initial $60 investment generating this series of annual incomes is 11.05 percent. But, again, remember this rate of return could be earned *only if the annual cut could be increased at the same rate as the expected average annual yield increase.*

If capturing the "allowable cut effect" is not possible, the rate of return is about 5 percent.

Given the following management schedules, in terms of the *difference* in yield between such a management program and the "do nothing but harvest" plan, the rate of return is about 5.05 percent:

A: With management.

Year	Stand Age	Activity	Volume Removed cu. ft.	Cost	Income*	Difference in: Volume Removed cu. ft.	Difference in: Net Cost or Income*
0	20	Precommercial thin	0	$60	0	0	-$60
20	40	Commercial thin	400	20	$100	400	+ 80
40	60	Commercial thin	500	20	125	500	+105
60	80	Commercial thin	700	20	175	700	+155
80	100	Harvest	1,500	30	375	800	+200
90	110	Harvest	1,500	30	375	900	+225
		Total	4,600	--	--		
All	All	Grazing	.10 AUM	0	.20		

B: With no management.

0	20	Nothing	0	0	0	--	--
80	100	Harvest	700	$30	$175	--	--
90	110	Harvest	600	30	150	--	--
		Total	1,300			--	--
All	All	Graze	.03 AUM	0	.06	--	--

*Assume stumpage value of $0.25/cubic foot.

Even though they cannot be measured in monetary terms, other key values--scenery, water yield, wildlife habitat, recreation, and fire hazard reduction--are also generated.

Gross growth is now 8 million ft^3 per year but could be increased.

Growth and Mortality -- Gross growth on State and private land is about 8 million ft^3 per year. A program to adequately stock the nonstocked or understocked area could increase the gross growth to about 11 million ft^3 annually.

Mortality is probably understated...

and so net growth may be less than estimated.

Mortality is difficult to estimate, especially with the inventory procedures used. Also, increased insect activity since the inventory has made a substantial increase in the number of trees dying, and therefore, a reduction in net growth. There is some evidence that mortality actually may be 3 or 4 times that calculated from the basic inventory data.

The estimated annual mortality of softwood growing stock and major causes are:

	$M\ ft^3$
Insects	72
Disease	56
Weather	36
Other	25
Total	189

Opportunities for Increasing Timber Supplies

Future timber supplies will be influenced by land use objectives of owners and by bringing additional areas of CFL under management.

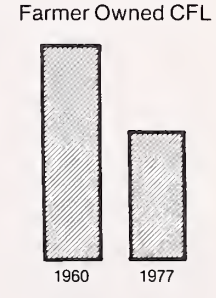
Basic factors that will influence future timber supplies from State and private lands include: (a) land use policies and programs for joint resource use on State lands; (b) objectives of nonindustrial private timberland owners; (c) technical advances in logging and utilization to bring currently inoperable areas under management; and (d) management money for stocking control.

Management objectives for State-owned land have been established.

A fully integrated resource use and protection posture is State policy, and land use policies and management objectives are already established. Management will be directed toward enhancing scenic values, recreation opportunities, and critical winter range for deer and elk, toward protecting the critical watersheds, reducing wildfire hazards, controlling mountain pine beetles, and maintaining the timber stands in a productive condition. Proposed timber supplies that reflect these nontimber land use objectives have been established for these lands and are included in the county timber management plans.

Objectives of non-industrial private owners vary, and can change.

The intent of small private owners, largely farmers, who hold much of the non-Federal CFL is an important matter. Although cutting has been increasing on such lands, substantial areas of otherwise productive forest land are being withdrawn from timber use in favor of summer or year-round homesite development. In 1960, the area of CFL in farmer ownership was estimated at 224,000 acres, some 70,000 acres more than 1977 (4).



Increased wood prices could bring inoperable areas under management.

The CFL now considered inoperable supports a good supply of timber. Harvesting it without damage to other important resources is not possible at the present. The price of wood will influence the speed with which cable, balloon, or helicopter techniques will invade the Black Hills.

Access to timber is good.

Access is not much of a problem. Almost all the CFL is within 5 miles of a haul road and 90 percent is less than 1.5 miles of an existing road. In addition, 90 percent of the CFL is within 35 miles of a sawmill or other wood-processing plant. Access to railroads is not quite as good.

Regeneration is a natural...

but usually comes in too great numbers.

Probably the most critical issue for future timber supplies has to do with stocking control. Regeneration in cutover stands is generally of little concern to managers after harvest. The frequent heavy seed crops combined with timely and abundant spring and summer precipitation make overstocking of seedlings the rule (1, 2, 3). Forty thousand seedlings per acre are not uncommon.

Continued thinnings will be necessary...

Such constant and heavy regeneration makes thinning a necessity for sustaining a reasonable growth rate and concentrating the growth on larger more valuable trees.

and much material will be available for pulp, posts, and poles.

Intermediate thinnings pay for themselves through pulp, posts, and pole sales. The usual management regimen is a precommercial thinning, additional entries for commercial thinning every 20 years, and ending with two shelterwood cuts for regeneration.

A major increase in timber output would mean giving up other forest values.

In Total -- Aside from making maximum timber output the sole objective of forest management (which would mean giving up much, if not all, the nontimber values now being generated), there are only a few ways supplies from State and private forest lands will be increased. First, there needs to be a...

Markets for merchantable material and management money are key items for...

■ Continued program of stocking control. Precommercial and commercial thinnings are requirements to maintain or increase output. Again, maintaining and expanding markets now for merchantable small materials are necessary to avoid a slowdown in otherwise commercial thinnings. Such thinnings on behalf of growing sawtimber trees make total

continued and increased stocking control.

management less expensive (net income rather than net cost action) and reduce the volume of usable wood left lying in the woods. Which brings up...

Better utilization...

■ Increased utilization. Better utilization of usable wood during logging operations could increase wood supplies. Present logging residues are estimated to be about 700,000 ft^3 per year.

Mill residues are being well utilized at the present except for sawdust and shavings. Slabs, edgings, and trimmings are being converted into chips and most of the bark is being utilized (11). But, meanwhile, back in the woods, there are lots of...

and cutting more usable dead wood will help.

■ Salvable dead trees. The volume of products realized from dead trees could be increased. In 1974, the total of such volume was 114,000 ft^3 for all ownerships. That represents only 0.2 percent of the total volume of salvable dead material. If more such trees could be economically removed, not only would timber supplies be increased, but there would also be room for...

Three-fourths of CFL area is producing all the growing stock growth.

Replacing slow or no-growth trees with GS trees would theoretically increase output about 4 million ft^3 per year.

■ More growing stock trees. It is estimated that only about 183,000 acres (75 percent of total) of State and private CFL are occupied with growing stock (GS) trees. The open area and that occupied by cull or dead trees and stagnated stands contribute little to current growth. In effect then, the approximately 8 million ft^3 of gross growth is being generated on three-fourths of the area. It would seem reasonable that getting the nonproducing area stocked with growing stock trees would increase growth and therefore supplies of timber. The theoretical possibility is that the potential of 12 million ft^3 per year can be achieved.

Here is a situation that is, however, probably only masquerading as a 4 million ft^3 opportunity. Nearly a third of the CFL is now inoperable and the acreage of the inoperable area not stocked with GS trees is not known. Also, establishing more GS trees on understocked operable areas can only happen gradually over the next 30 years, the planned period for achieving regulation. In the long run, the biggest opportunity for increasing supplies is to...

But it probably won't happen for at least 30 years.

Logging techniques not now being used in western South Dakota...

■ Bring as many inoperable areas as possible under management. The areas totaling 90,000 acres now included in the "inoperable" category have the potential to grow nearly 3 million ft^3 per year. Probably not all such areas can be brought under management. But, getting even part of the potential will require two important things: logging techniques not now being used to manage the new stands and money.

and more management money are the keys to capturing wood from the now inoperable area.

Such high-priced methods as balloon, cable, or helicopter logging will result in higher prices for the products generated. More management money will be required. It costs more to operate on steep slopes than on flat ground. Also, there will be more acres to treat annually once the steeper slopes in the inoperable area are opened up.

ABOUT THE BLACK HILLS NATIONAL FOREST

Resource Use and Management Direction

Planned management of the timber resources of the Black Hills National Forest will...

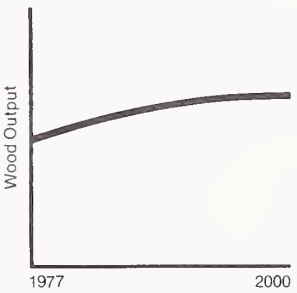
Use and management of the resources of the Black Hills National Forest are directed toward sustaining the high quality environment while capturing the multiple benefits potentially available from the existing resources (12).

Major objectives are to enhance key values of scenery, recreation, and wildlife, as well as providing timber, watershed, and range values. And one of the most important vehicles for achieving these goals is manipulating the timber resource.

Consequences of Timber Management

increase timber output to 190 million bd.ft...

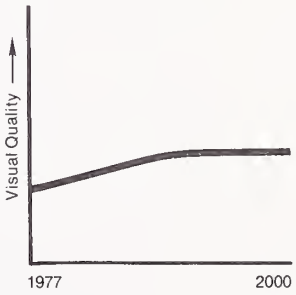
The timber management proposed for the Black Hills National Forest[6] will result in an annual output of 36 million ft^3 of roundwood, (190 million bd.ft. Scribner rule or 213 million, International 1/4-inch rule), a substantial increase over current output (152 million bd.ft. Scribner). All associated resource values will be affected in a positive way, even though planned timber output will not reach as high a level as would be possible if the goal were to maximize timber production.



Recreation

provide more varied and pleasing landscape...

Recreational use of the National Forest is expected to rise to an estimated 3 million visitor-days by 1990. Scenery is important to Black Hills visitors, else they would not be there. Increased harvesting and thinning will reduce the visual monotony of dense stands and create a more varied landscape.



[6]The effects of management are from the final Environmental Impact Statement for the timber management plan on the Black Hills National Forest (12).

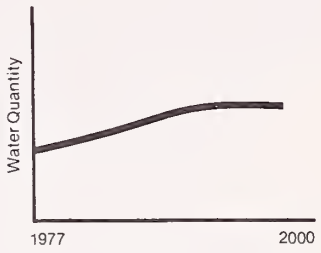
Water

increase water supplies by 7,500 acre feet...

Reducing stand densities will provide more water. Planned management is estimated to increase surface flow by 2,000 acre-feet per year and subsurface water by about 5,500 acre-feet during a year of average rainfall. More snow will reach the ground and drift. This will result in a slower and larger addition to streamflows in the spring.

Grazing and Wildlife

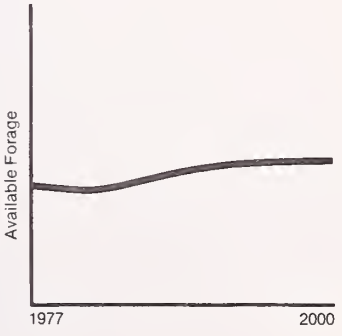
Planned management activities for the timber will increase both the acreage available for livestock grazing and the amount of herbage produced. Also, wildlife habitat will increase in area and quality. The values so generated by increased tree removals are substantial.



double big game browse and provide a threefold increase in grazing potential...

To maximize wood output, stands should be maintained at about 120 to 140 ft^2 of basal area per acre. At such density, herbage production is only about 60 pounds per acre (9, 12). If a cow could walk through such a stand, she would need about 32 acres of it to feed herself and her calf for a month, at the recommended utilization rate of 40 percent.

At the planned stand density of about 80 ft^2 of basal area, there will be 260 pounds of herbage per acre (9, 12), requiring only about 10 acres to feed them for a month. That is more than a threefold increase in grazing capacity over that from a program to maximize wood output. In addition, wildlife browse production will double to 40 pounds per acre per year.

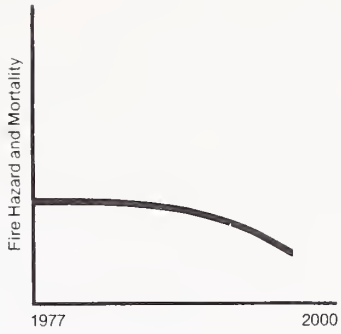


Other Effects

and reduce mortality from pine beetles and potential loss to wildfires.

The proposed timber management plan would also help control the present mountain pine beetle outbreak and reduce chances for future losses by increasing the vigor of stands susceptible to attack. The overall effect would be to reduce mortality and increase net growth.

In addition, the potential for destructive wildfires will be reduced and so also the probability of loss of timber and associated resource values.



Key Issues for Future

The key issues are maintaining markets for small-size trees...

and adequate management money.

The prospects for the future of the resources of the Black Hills National Forest pivot on the same basic issues as for State and private lands: markets and management money.

If lack of markets for small trees slack off, thinning may become more costly. Fewer acres would be treated annually and the total benefits associated with the scheduled thinning would be reduced.

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APPENDIX

Glossary and Tables

Glossary

Land Use Classes

Forest land — Land at least 16.7 percent stocked by forest trees of any size, or formerly having had such tree cover, and not currently developed for nonforest use. (Note: Stocking is measured by comparison of basal area and/or number of trees, by age or size and spacing with specified standards. The minimum area for classification of forest land is 1 acre. Roadside, streamside, and shelterbelt strips of timber must have a crown width of at least 120 ft to qualify as forest land. Unimproved roads and trails, streams, or other bodies of water or clearings in forest areas shall be classed as forest if less than 120 ft in width.) Also see definitions for land area, commercial forest land, stocking, unproductive forest land, and water.

Commercial forest land. — Forest land producing or capable of producing crops of industrial wood and not withdrawn from timber utilization (Note: Areas qualifying as commercial forest land have the capability of producing in excess of 20 ft^3 per acre per year of industrial wood under management. Currently inaccessible and inoperable areas are included, except when the areas involved are small and unlikely to become suitable for production and industrial wood in the foreseeable future.)

Deferred forest land — National Forest lands that meet productivity standards for commercial forest, but are under study for possible inclusion in the Wilderness System.

Unregulated forest land — Portions of commercial forest land and the noncommercial forest land that will not be utilized for sustained timber production.

Noncommercial forest land — (1) Unproductive forest land incapable of yielding crops of industrial wood because of adverse site conditions, and (2) productive-reserved forest land.

Productive-reserved forest land — Forest land sufficiently productive to qualify as commercial forest land, but withdrawn from timber utilization through statute, administrative designation, or exclusive use for Christmas tree production.

Unproductive forest land — Forest land incapable of producing 20 ft^3 per acre of industrial wood under natural conditions, because of adverse site conditions. (Note: Adverse conditions include sterile soils, dry climate, poor drainage, high elevation, steepness, and rockiness.)

Nonforest land — Land that has never supported forests and lands formerly forested where use for timber management is prevented by development for other uses. (Note: Includes areas used for crops, improved pasture, residential areas, city parks, improved roads of any width and adjoining clearings, powerline clearings of any width, and 1- to 40-acre areas

of water classified by the Bureau of the Census as land. If intermingled in forest areas, unimproved roads and nonforest strips must be more than 120 ft wide and clearings more than 1 acre in size to qualify as nonforest land.)

Ownership Classes

Ownership — Property owned by one owner, regardless of the number of parcels in a specified area.

National Forest land — Federal lands that have been legally designated as National Forest or purchase units and other lands under the administration of the Forest Service, including experimental areas and Bankhead-Jones Title III lands.

Bureau of Land Management lands — Federal land administered by the Bureau of Land Management.

Miscellaneous Federal lands — Federal lands other than National Forest lands, lands administered by the Bureau of Land Management, and Indian lands.

Other Federal lands — Federal lands other than National Forest lands, including lands administered by the Bureau of Land Management, Bureau of Indian Affairs, and other Federal agencies.

State, county, and municipal lands — Lands owned by States, counties, and local public agencies or municipalities, or lands leased to these governmental units for 50 years or more.

Other public — All Federal lands other than National Forest lands, and State, county, and municipal lands.

Farmer-owned lands — Lands owned by farm operators. (Note: These exclude land leased by farm operators from nonfarm owners, such as railroad companies and States.)

Forest industry lands — Lands owned by companies or individuals operating wood-using plants.

Forest Type and Tree Species

Forest types — A classification of forest land based upon the species forming a plurality of live-tree stocking. (Note: Types shall be determined on the basis of species plurality of all live trees that contribute to stocking; that is, up to a maximum of 16 percent at each plot point based upon a 10-point location.)

Major forest type — A grouping of local forest types into about 10 eastern and 10 western groups. The groupings are based upon similar and associated species.

Commercial species — Tree species presently or prospectively suitable for industrial wood products. (Note: Excludes species of typically small size, poor form, or inferior quality, such as hawthorn and sumac, scrub willow, and alder.)

Noncommercial species — Tree species of typically small size, poor form, or inferior quality that normally do not develop into trees suitable for industrial wood products.

Softwoods — Coniferous trees, usually evergreen having needles or scalelike leaves.

Hardwoods — Dicotyledonous trees, usually broad-leaved and deciduous.

Class of Timber

Growing stock trees — Live trees of commercial species meeting specified standards of quality or vigor; excludes cull trees.

Rough trees — (1) Live trees of commercial species that do not contain at least one 12-foot saw log or two noncontiguous saw logs, each 8 ft long or longer--now or prospectively--and/or do not meet regional specifications for freedom from defect primarily because of roughness or poor form; (2) all live trees of noncommercial species.

Rotten trees — Live trees of commercial species that do not contain at least one 12-foot saw log, or two noncontiguous saw logs, each 8 ft long or longer--now or prospectively--and/or do not meet regional specifications for freedom from defect primarily because of rot; that is, when more than 50 percent of the cull volume in a tree is rotten.

Cull — Portions of a tree that are unusable for industrial wood products because of rot, form, or other defect.

Salvable dead trees — Standing or down dead trees that are considered merchantable by regional standards.

Mortality trees — Growing stock trees dying from natural causes during a specified period, usually annually.

Diameters and Size Classes

Diameter classes — A classification of trees based on diameter outside bark, measured at breast height (4-1/2 ft above the ground). (Note: "d.b.h." is the common abbreviation for diameter at breast height. Two-inch diameter classes are commonly used in Forest Survey, with the even inch the approximate midpoint for a class. For example, the 6-inch class includes trees 5.0 through 6.9 inches d.b.h., inclusive.)

Tree size class — A classification of trees based on diameter at breast height, including sawtimber trees, poletimber trees, and saplings and seedlings.

Seedlings — Live trees less than 1.0 inch d.b.h.

Saplings — Trees 1.0 to 5.0 inches d.b.h.

Poletimber trees

Trees at least 5.0 inches d.b.h., but smaller than sawtimber size.

Sawtimber trees

Trees exceeding poletimber size. In the Intermountain States, the minimum d.b.h. for softwood sawtimber is 9.0 inches and for hardwoods 11.0 inches.

Volume

Net volume

Gross volume less deductions for rot, sweep, or other defect affecting use for timber products.

Growing stock volume

Net volume in cubic feet of live sawtimber trees and live poletimber trees from stump to a minimum 4.0 inch top (of central stem) outside bark. Net volume equals gross volume less deduction for rot and missing bole sections.

International 1/4-inch rule

The standard board-foot log rule adopted nationally by the Forest Service for the presentation of Forest Survey volume statistics.

Growth and Mortality

Gross growth

Annual increase in net volume of trees in the absence of cutting and mortality. The total includes ingrowth and accretion.

Net annual growth

The increase in net volume of a specified size class for a specific year. (Note: Components of net annual growth include the increment in net volume of trees at the beginning of the specific year that survive to the year's end, plus the net volume of trees that reach the size class during the year, minus the net volume of trees that died during the year, minus the net volume of trees that became rough or rotten during the year.)

Mortality

Number of sound-wood volume growing stock trees dying from natural causes during a specified period.

Timber Cut

Allowable cut

The volume of timber that could be cut on commercial forest land during a given period under specified management plans aimed at sustained production of timber products.

Timber removals

The net volume of growing stock trees, removed from the inventory by harvesting, or by such cultural operations as timber-stand improvement, land clearing, or changes in land use.

Timber products

Roundwood products and plant byproducts. (Note: Timber products output includes roundwood products cut from growing stock on commercial forest land, and from other sources, such as cull trees, salvable dead trees, limbs, and saplings, or from trees on noncommercial and nonforest lands, and from plant byproducts.)

Roundwood products

Logs, bolts, or other round sections cut from trees for industrial or consumer uses. (Note: Includes saw logs, veneer logs, and bolts, cooperage logs and bolts, pulpwood, fuelwood, piling, poles, hewn ties, mine timbers, and various other round, split, or hewn products.)

Plant residues

Wood materials from manufacturing plants not utilized for some product. (Note: Includes slabs, edgings, trimmings, miscuts, sawdust, shavings, veneer cores and clippings, and pulp screenings.)

Logging residues

The unused portions of trees cut or killed by logging.

Other removals

The net volume of growing stock trees removed from the inventory by cultural operations, such as timber stand improvements, land clearing, and changes in land use.

Rotation

The period of years between establishment of a stand of timber and the time when it is considered to be ready for cutting and regeneration.

Quality

Industrial wood

All roundwood products, except fuelwood.

Site

Site class

A classification of forest land in terms of inherent capacity to grow crops of industrial wood.

Site classifications are based upon the mean annual growth of growing stock (not including thinnings) attainable in fully stocked stands at culmination of mean annual growth. Height-age relationships are usually used as indicators of the specified volume-site class.

Stand Size Classes

Stand-size class

A classification of forest land based on the size class of growing stock trees on the area, that is, sawtimber, poletimber, or seedlings, and saplings. (Note: Only those trees that contribute to no more than 16 percent stocking at a plot point, based upon a 10-point location, will be considered in determining stand-size class.)

Sawtimber stands

a. Stands at least 16.7 percent stocked with growing stock trees, with half or more of total stocking in sawtimber or poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

Poletimber stands

b. Stands at least 16.7 percent stocked with growing stock trees in which half or more of this stocking is in poletimber and/or sawtimber trees, and with poletimber stocking exceeding that of sawtimber.

Sapling-seedling stands

c. Stands at least 16.7 percent stocked with growing stock trees in which more than half of the stocking is saplings and/or seedlings.

Nonstocked land

d. Commercial forest land less than 16.7 percent stocked with growing stock trees.

Stand Density and Stocking

Stand density

A quantitative measure of a stand in terms of square feet of basal area, number of trees, or volume per acre. It reflects the degree of crowding of stems within the area.

Stocking

A relative term used to describe the adequacy of a given stand density in meeting the management objectives.

Basal area

The cross-sectional area of a tree stem, in square feet, at a point 4.5 ft above the ground. Basal area per acre is the sum of the basal areas of all the trees on the acre.

Growing stock level

Basal area (square feet) per acre that will remain after thinning when average stand diameter is 10 inches or more.

Table 1.--*Land area by county and major land class; western South Dakota, 1977*

County[1]	Total land area[2]	Total forest land area	Commercial timberland	All other forest land			Nonforest land area[3]
				Productive reserved	Other forest reserved	Other forest nonreserved	
	Thousand acres						
Butte, Harding, Meade	3,712.4	103.3	82.9	--	--	20.4	3,609.1
Custer	879.3	398.3	362.1	10.0	.2	26.0	481.0
Fall River	1,115.6	93.3	57.5	--	--	35.8	1,022.3
Lawrence	512.0	351.8	334.8	--	--	17.0	160.2
Pennington	659.5	420.6	409.5	1.1	1.1	8.9	238.9
Total	6,878.8	1,367.3	1,246.8	11.1	1.3	108.1	5,511.5
Percent of total	100.0	19.9	18.1	.2	(4)	1.6	80.1

[1]This and all later tables include only the portions of Custer, Meade, and Pennington Counties west of the 103rd meridian.

[2]From U.S. Bureau of the Census, Land and Water Area of the United States, 1970.

[3]Includes 8,300 acres classed as water by Renewable Resources Evaluation standards, but defined as land by the Bureau of the Census.

[4]Less than 0.05 percent.

Table 2.--*Area of commercial timberland by ownership class and county; western South Dakota, 1977*

Ownership class	COUNTY					
	Butte, Harding, Meade	Custer	Fall River	Lawrence	Pennington	Total
	Thousand acres					
National Forest	44.2	262.2	19.4	259.3	367.4	952.5
BLM	1.3	0.8	0.3	5.1	--	7.5
Indian	--	--	--	--	--	--
Miscellaneous federal	--	--	0.5	--	0.5	1.0
State	5.0	55.7	3.0	2.4	0.9	67.0
County and municipal	0.1	--	--	2.1	1.2	3.4
Forest industry[1]	--	--	--	--	--	--
Farmer	18.6	41.8	29.1	36.7	28.4	154.6
Miscellaneous private	13.7	1.6	5.2	29.2	11.1	60.8
All ownerships	82.9	362.1	57.5	334.8	409.5	1,246.8

[1]Forest industry has been combined with Miscellaneous private to avoid disclosure of an individual owner, on this and all tables that follow.

Table 3.--*Area of commercial timberland by county, owner group, forest type, stand-size class, and site class; western South Dakota, 1977*

County	Forest type and stand-size class	National Forest					Other public					Forest industry					Other private					All ownerships				
		Site class					Site class					Site class					Site class					Site class				
		165+	120-164	85-119	50-84	20-49	Total	165+	120-164	85-119	50-84	20-49	Total	165+	120-164	85-119	50-84	20-49	Total	165+	120-164	85-119	50-84	20-49	Total	165+	120-164	85-119	50-84	20-49	Total
		Thousand acres																											
Butte, Harding, Meade	Ponderosa pine:																												
	Sawtimber	--	--	(1)	5.1	20.4	25.5	--	--	--	0.3	2.2	2.5	--	--	--	--	--	--	--	--	--	2.7	10.6	13.3	--	--	(1)	8.1	33.2	41.3
	Poletimber	--	--	--	1.7	12.7	14.4	--	--	--	.2	2.0	2.2	--	--	--	--	--	--	--	--	--	.9	10.0	10.9	--	--	--	2.8	24.7	27.5
	Sapling and seedling	--	--	--	.9	2.3	3.2	--	--	--	--	.5	.5	--	--	--	--	--	--	--	--	--	--	2.4	2.4	--	--	--	.9	5.2	6.1
	Nonstocked	--	--	--	(1)	.1	.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(1)	.1	.1
	Total	--	--	(1)	7.7	35.5	43.2	--	--	--	.5	4.7	5.2	--	--	--	--	--	--	--	--	--	3.6	23.0	26.6	--	--	(1)	11.8	63.2	75.0
	Fir-spruce:																												
	Sawtimber	--	--	0.1	.2	(1)	.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.1	.2	(1)	.3
	Poletimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Sapling and seedling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Total	--	--	.1	.2	(1)	.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.1	.2	(1)	.3
	Hardwoods:																												
	Sawtimber	--	--	--	.2	.3	.5	--	--	--	.1	.7	.8	--	--	--	--	--	--	--	--	--	.5	3.8	4.3	--	--	--	.8	4.8	5.6
	Poletimber	--	--	--	--	.2	.2	--	--	--	--	.3	.3	--	--	--	--	--	--	--	--	--	--	.9	.9	--	--	--	--	1.4	1.4
	Sapling and seedling	--	--	--	--	(1)	(1)	--	--	--	--	.1	.1	--	--	--	--	--	--	--	--	--	--	.5	.5	--	--	--	--	.6	.6
	Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Total	--	--	--	.2	.5	.7	--	--	--	.1	1.1	1.2	--	--	--	--	--	--	--	--	--	.5	5.2	5.7	--	--	--	.8	6.8	7.6
	All forest types:																												
	Sawtimber	--	--	.1	5.5	20.7	26.3	--	--	--	.4	2.9	3.3	--	--	--	--	--	--	--	--	--	3.2	14.4	17.6	--	--	.1	9.1	38.0	47.2
	Poletimber	--	--	--	1.7	12.9	14.6	--	--	--	.2	2.3	2.5	--	--	--	--	--	--	--	--	--	.9	10.9	11.8	--	--	--	2.8	26.1	28.9
	Sapling and seedling	--	--	--	.9	2.3	3.2	--	--	--	--	.6	.6	--	--	--	--	--	--	--	--	--	--	2.9	2.9	--	--	--	.9	5.8	6.7
	Nonstocked	--	--	--	(1)	.1	.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(1)	.1	.1
	Total	--	--	.1	8.1	36.0	44.2	--	--	--	.6	5.8	6.4	--	--	--	--	--	--	--	--	--	4.1	28.2	32.3	--	--	.1	12.8	70.0	82.9
Custer	Ponderosa pine:																												
	Sawtimber	--	--	.9	20.1	162.2	183.2	--	--	--	2.3	33.6	35.9	--	--	--	--	--	--	--	--	--	1.4	16.4	17.8	--	--	.9	23.8	212.2	236.9
	Poletimber	--	--	--	--	65.4	65.4	--	--	--	.1	6.5	6.6	--	--	--	--	--	--	--	--	--	.5	10.9	11.4	--	--	--	.6	82.8	83.4
	Sapling and seedling	--	--	--	--	9.4	9.4	--	--	--	(1)	12.9	12.9	--	--	--	--	--	--	--	--	--	1.0	12.2	13.2	--	--	--	1.0	34.5	35.5
	Nonstocked	--	--	--	--	.1	.1	--	--	--	--	1.1	1.1	--	--	--	--	--	--	--	--	--	--	.5	.5	--	--	--	--	1.7	1.7
	Total	--	--	.9	20.1	237.1	258.1	--	--	--	2.4	54.1	56.5	--	--	--	--	--	--	--	--	--	2.9	40.0	42.9	--	--	.9	25.4	331.2	357.5
	Fir-spruce:																												
	Sawtimber	--	--	.7	2.8	.1	3.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.7	2.8	.1	3.6
	Poletimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Sapling and seedling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Total	--	--	.7	2.8	.1	3.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.7	2.8	.1	3.6
	Hardwoods:																												
	Sawtimber	--	--	--	.1	.3	.4	--	--	--	--	(1)	(1)	--	--	--	--	--	--	--	--	--	--	.5	.5	--	--	--	.1	.8	.9
	Poletimber	--	--	--	--	(1)	(1)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(1)	(1)
	Sapling and seedling	--	--	--	--	.1	.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.1	.1
	Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Total	--	--	--	.1	.4	.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.5	.5	--	--	--	.1	.9	1.0
	All forest types:																												
	Sawtimber	--	--	1.6	23.0	162.6	187.2	--	--	--	2.3	33.6	35.9	--	--	--	--	--	--	--	--	--	1.4	16.9	18.3	--	--	1.6	26.7	213.1	241.4
	Poletimber	--	--	--	--	65.4	65.4	--	--	--	.1	6.5	6.6	--	--	--	--	--	--	--	--	--	.5	10.9	11.4	--	--	--	.6	82.8	83.4
	Sapling and seedling	--	--	--	--	9.5	9.5	--	--	--	(1)	12.9	12.9	--	--	--	--	--	--	--	--	--	1.0	12.2	13.2	--	--	--	1.0	34.6	35.6
	Nonstocked	--	--	--	--	.1	.1	--	--	--	--	1.1	1.1	--	--	--	--	--	--	--	--	--	--	.5	.5	--	--	--	--	1.7	1.7
	Total	--	--	1.6	23.0	237.6	262.2	--	--	--	2.4	54.1	56.5	--	--	--	--	--	--	--	--	--	2.9	40.5	43.4	--	--	1.6	28.3	332.2	362.1

[1]Less than 50 acres.

Table 3 (con.)

County	Forest type and stand-size class	National Forest						Other public						Forest industry						Other private						All ownerships					
		Site class						Site class						Site class						Site class						Site class					
		165+	120-164	85-119	50-84	20-49	Total	165+	120-164	85-119	50-84	20-49	Total	165+	120-164	85-119	50-84	20-49	Total	165+	120-164	85-119	50-84	20-49	Total	165+	120-164	85-119	50-84	20-49	Total
		Thousand acres																													
Fall River	Ponderosa pine:																														
	Sawtimber	--	--	0.1	0.8	12.2	13.1	--	--	--	--	1.8	1.8	--	--	--	--	--	--	--	--	--	--	16.0	16.0	--	--	0.1	0.8	30.0	30.9
	Poletimber	--	--	--	--	5.6	5.6	--	--	--	(1)	.7	.7	--	--	--	--	--	--	--	--	--	0.5	6.3	6.8	--	--	--	.5	12.6	13.1
	Sapling and seedling	--	--	--	--	.5	.5	--	--	--	--	.8	.8	--	--	--	--	--	--	--	--	--	--	7.1	7.1	--	--	--	--	8.4	8.4
	Nonstocked	--	--	--	--	--	--	--	--	--	0.1	.4	.5	--	--	--	--	--	--	--	--	--	.5	3.9	4.4	--	--	--	.6	4.3	4.9
	Total	--	--	.1	.8	18.3	19.2	--	--	--	.1	3.7	3.8	--	--	--	--	--	--	--	--	--	1.0	33.3	34.3	--	--	.1	1.9	55.3	57.3
	Fir-spruce:																														
	Sawtimber	--	--	(1)	.2	--	.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(1)	.2	--	.2
	Poletimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Sapling and seedling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Total	--	--	(1)	.2	--	.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(1)	.2	--	.2
	Hardwoods:																														
	Sawtimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Poletimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Sapling and seedling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	All forest types:																														
	Sawtimber	--	--	.1	1.0	12.2	13.3	--	--	--	--	1.8	1.8	--	--	--	--	--	--	--	--	--	--	16.0	16.0	--	--	.1	1.0	30.0	31.1
	Poletimber	--	--	--	--	5.6	5.6	--	--	--	(1)	.7	.7	--	--	--	--	--	--	--	--	--	.5	6.3	6.8	--	--	--	.5	12.6	13.1
	Sapling and seedling	--	--	--	--	.5	.5	--	--	--	--	.8	.8	--	--	--	--	--	--	--	--	--	--	7.1	7.1	--	--	--	--	8.4	8.4
	Nonstocked	--	--	--	--	--	--	--	--	--	.1	.4	.5	--	--	--	--	--	--	--	--	--	.5	3.9	4.4	--	--	--	.6	4.3	4.9
	Total	--	--	.1	1.0	18.3	19.4	--	--	--	.1	3.7	3.8	--	--	--	--	--	--	--	--	--	1.0	33.3	34.3	--	--	.1	2.1	55.3	57.5
Lawrence	Ponderosa pine:																														
	Sawtimber	--	--	.6	25.5	145.2	171.3	--	--	--	.7	3.8	4.5	--	--	--	--	--	--	--	--	--	4.1	26.1	30.2	--	--	.6	30.3	175.1	206.0
	Poletimber	--	--	--	--	58.6	58.6	--	--	--	.1	1.1	1.2	--	--	--	--	--	--	--	--	--	1.1	6.6	7.7	--	--	--	1.2	66.3	67.5
	Sapling and seedling	--	--	--	--	9.0	9.0	--	--	--	.2	.4	.6	--	--	--	--	--	--	--	--	--	1.0	2.5	3.5	--	--	--	1.2	11.9	13.1
	Nonstocked	--	--	--	--	1.2	1.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.2	1.2
	Total	--	--	.6	25.5	214.0	240.1	--	--	--	1.0	5.3	6.3	--	--	--	--	--	--	--	--	--	6.2	35.2	41.4	--	--	.6	32.7	254.5	287.8
	Fir-spruce:																														
	Sawtimber	--	--	.6	5.5	1.3	7.4	--	--	--	.2	.5	.7	--	--	--	--	--	--	--	--	--	1.5	3.1	4.6	--	--	.6	7.2	4.9	12.7
	Poletimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Sapling and seedling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Total	--	--	.6	5.5	1.3	7.4	--	--	--	.2	.5	.7	--	--	--	--	--	--	--	--	--	1.5	3.1	4.6	--	--	.6	7.2	4.9	12.7
	Hardwoods:																														
	Sawtimber	--	--	--	2.8	5.3	8.1	--	--	--	.4	1.7	2.1	--	--	--	--	--	--	--	--	--	3.8	11.9	15.7	--	--	--	7.0	18.9	25.9
	Poletimber	--	--	--	--	2.5	2.5	--	--	--	.1	.1	.2	--	--	--	--	--	--	--	--	--	.5	1.0	1.5	--	--	--	.6	3.6	4.2
	Sapling and seedling	--	--	--	--	1.2	1.2	--	--	--	.1	.2	.3	--	--	--	--	--	--	--	--	--	.5	2.2	2.7	--	--	--	.6	3.6	4.2
	Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Total	--	--	--	2.8	9.0	11.8	--	--	--	.6	2.0	2.6	--	--	--	--	--	--	--	--	--	4.8	15.1	19.9	--	--	--	8.2	26.1	34.3
	All forest types:																														
	Sawtimber	--	--	1.2	33.8	151.8	186.8	--	--	--	1.3	6.0	7.3	--	--	--	--	--	--	--	--	--	9.4	41.1	50.5	--	--	1.2	44.5	198.9	244.6
	Poletimber	--	--	--	--	61.1	61.1	--	--	--	.2	1.2	1.4	--	--	--	--	--	--	--	--	--	1.6	7.6	9.2	--	--	--	1.8	69.9	71.7
	Sapling and seedling	--	--	--	--	10.2	10.2	--	--	--	.3	.6	.9	--	--	--	--	--	--	--	--	--	1.5	4.7	6.2	--	--	--	1.8	15.5	17.3
	Nonstocked	--	--	--	--	1.2	1.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.2	1.2
	Total	--	--	1.2	33.8	224.3	259.3	--	--	--	1.8	7.8	9.6	--	--	--	--	--	--	--	--	--	12.5	53.4	65.9	--	--	1.2	48.1	285.5	334.8

[1] Less than 50 acres.

Table 3. (con.)

County	Forest type and stand-size class	National Forest					Other public						Forest industry						Other private						All ownerships					
		Site class				Total	Site class				Total		Site class				Total		Site class				Total		Site class				Total	
		165+	120-164	85-119	50-84	20-49		165+	120-164	85-119	50-84	20-49		165+	120-164	85-119	50-84	20-49		165+	120-164	85-119	50-84	20-49		165+	120-164	85-119	50-84	20-49	
		Thousand acres																												
Pennington	Ponderosa pine:																													
	Sawtimber	--	--	1.0	32.3	216.6	249.9	--	--	--	0.3	0.9	1.2	--	--	--	--	--	--	--	--	--	3.7	15.7	19.4	--	--	1.0	36.3	233.2	270.5
	Poletimber	--	--	--	--	90.3	90.3	--	--	--	.1	1.1	1.2	--	--	--	--	--	--	--	--	--	1.0	14.7	15.7	--	--	--	1.1	106.1	107.2
	Sapling and seedling	--	--	--	--	13.2	13.2	--	--	--	(1)	.2	.2	--	--	--	--	--	--	--	--	--	.6	3.2	3.8	--	--	--	.6	16.6	17.2
	Nonstocked	--	--	--	--	.6	.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.6	.6
	Total	--	--	1.0	32.3	320.7	354.0	--	--	--	.4	2.2	2.6	--	--	--	--	--	--	--	--	--	5.3	33.6	38.9	--	--	1.0	38.0	356.5	395.5
	Fir-spruce:																													
	Sawtimber	--	--	1.1	4.9	.9	6.9	--	--	--	(1)	--	(1)	--	--	--	--	--	--	--	--	--	.6	--	.6	--	--	1.1	5.5	.9	7.5
	Poletimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Sapling and seedling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Total	--	--	1.1	4.9	.9	6.9	--	--	--	(1)	--	(1)	--	--	--	--	--	--	--	--	--	.6	--	.6	--	--	1.1	5.5	.9	7.5
	Hardwoods:																													
	Sawtimber	--	--	--	1.6	2.9	4.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.6	2.9	4.5
	Poletimber	--	--	--	--	1.3	1.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.3	1.3
	Sapling and seedling	--	--	--	--	.7	.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.7	.7
	Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Total	--	--	--	1.6	4.9	6.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.6	4.9	6.5
	All forest types:																													
	Sawtimber	--	--	2.1	38.8	220.4	261.3	--	--	--	.3	.9	1.2	--	--	--	--	--	--	--	--	--	4.3	15.7	20.0	--	--	2.1	43.4	237.0	282.5
	Poletimber	--	--	--	--	91.6	91.6	--	--	--	.1	1.1	1.2	--	--	--	--	--	--	--	--	--	1.0	14.7	15.7	--	--	--	1.1	107.4	108.5
	Sapling and seedling	--	--	--	--	13.9	13.9	--	--	--	(1)	.2	.2	--	--	--	--	--	--	--	--	--	.6	3.2	3.8	--	--	--	.6	17.3	17.9
	Nonstocked	--	--	--	--	.6	.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.6	.6
	Total	--	--	2.1	38.8	326.5	367.4	--	--	--	.4	2.2	2.6	--	--	--	--	--	--	--	--	--	5.9	33.6	39.5	--	--	2.1	45.1	362.3	409.5
All counties	Ponderosa pine:																													
	Sawtimber	--	--	2.6	83.8	556.6	643.0	--	--	--	3.6	42.3	45.9	--	--	--	--	--	--	--	--	--	11.9	84.8	96.7	--	--	2.6	99.3	683.7	785.6
	Poletimber	--	--	--	1.7	232.6	234.3	--	--	--	.5	11.4	11.9	--	--	--	--	--	--	--	--	--	4.0	48.5	52.5	--	--	--	6.2	292.5	298.7
	Sapling and seedling	--	--	--	.9	34.4	35.3	--	--	--	.2	14.8	15.0	--	--	--	--	--	--	--	--	--	2.6	27.4	30.0	--	--	--	3.7	76.6	80.3
	Nonstocked	--	--	--	(1)	2.0	2.0	--	--	--	.1	1.5	1.6	--	--	--	--	--	--	--	--	--	.5	4.4	4.9	--	--	--	.6	7.9	8.5
	Total	--	--	2.6	86.4	825.6	914.6	--	--	--	4.4	70.0	74.4	--	--	--	--	--	--	--	--	--	19.0	165.1	184.1	--	--	2.6	109.8	1,060.7	1,173.1
	Fir-spruce:																													
	Sawtimber	--	--	2.5	13.6	2.3	18.4	--	--	--	.2	.5	.7	--	--	--	--	--	--	--	--	--	2.1	3.1	5.2	--	--	2.5	15.9	5.9	24.3
	Poletimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Sapling and seedling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Total	--	--	2.5	13.6	2.3	18.4	--	--	--	.2	.5	.7	--	--	--	--	--	--	--	--	--	2.1	3.1	5.2	--	--	2.5	15.9	5.9	24.3
	Hardwoods:																													
	Sawtimber	--	--	--	4.7	8.8	13.5	--	--	--	.5	2.4	2.9	--	--	--	--	--	--	--	--	--	4.3	16.2	20.5	--	--	--	9.5	27.4	36.9
	Poletimber	--	--	--	--	4.0	4.0	--	--	--	.1	.4	.5	--	--	--	--	--	--	--	--	--	.5	1.9	2.4	--	--	--	.6	6.3	6.9
	Sapling and seedling	--	--	--	--	2.0	2.0	--	--	--	.1	.3	.4	--	--	--	--	--	--	--	--	--	.5	2.7	3.2	--	--	--	.6	5.0	5.6
	Nonstocked	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Total	--	--	--	4.7	14.8	19.5	--	--	--	.7	3.1	3.8	--	--	--	--	--	--	--	--	--	5.3	20.8	26.1	--	--	--	10.7	38.7	49.4
	All forest types:																													
	Sawtimber	--	--	5.1	102.1	567.7	674.9	--	--	--	4.3	45.2	49.5	--	--	--	--	--	--	--	--	--	18.3	104.1	122.4	--	--	5.1	124.7	717.0	846.8
	Poletimber	--	--	--	1.7	236.6	238.3	--	--	--	.6	11.8	12.4	--	--	--	--	--	--	--	--	--	4.5	50.4	54.9	--	--	--	6.8	298.8	305.6
	Sapling and seedling	--	--	--	.9	36.4	37.3	--	--	--	.3	15.1	15.4	--	--	--	--	--	--	--	--	--	3.1	30.1	33.2	--	--	--	4.3	81.6	85.9
	Nonstocked	--	--	--	(1)	2.0	2.0	--	--	--	.1	1.5	1.6	--	--	--	--	--	--	--	--	--	.5	4.4	4.9	--	--	--	.6	7.9	8.5
	Total	--	--	5.1	104.7	842.7	952.5	--	--	--	5.3	73.6	78.9	--	--	--	--	--	--	--	--	--	26.4	189.0	215.4	--	--	5.1	136.4	1,105.3	1,246.8

[1] Less than 50 acres.

Table 4.--*Net volume of growing stock and sawtimber on commercial timberland by county, softwoods and hardwoods, and owner group; western South Dakota, 1977*

County	All owner groups	National Forest	Other public	Forest industry	Other private	All owner groups	National Forest	Other public	Forest industry	Other private
	Thousand cubic feet					*Thousand board feet*[1]				
Butte, Harding, Meade										
Softwoods	81,311	52,904	4,404	--	24,003	242,092	162,926	11,766	--	67,400
Hardwoods	2,503	300	227	--	1,976	7,728	287	530	--	6,911
All species	83,814	53,204	4,631	--	25,979	249,820	163,213	12,296	--	74,311
Custer										
Softwoods	436,480	355,279	56,185	--	25,016	1,504,119	1,241,461	197,338	--	65,320
Hardwoods	1,410	1,131	11	--	238	486	391	5	--	90
All species	437,890	356,410	56,226	--	25,254	1,504,605	1,241,852	197,343	--	65,410
Fall River										
Softwoods	41,217	23,082	1,810	--	16,325	123,005	74,453	4,973	--	43,579
Hardwoods	106	48	8	--	50	206	9	27	--	170
All species	41,323	23,130	1,818	--	16,375	123,211	74,462	5,000	--	43,749
Lawrence										
Softwoods	482,608	375,896	13,637	--	93,075	1,726,936	1,336,572	48,821	--	341,543
Hardwoods	8,616	4,224	550	--	3,842	6,548	4,170	311	--	2,067
All species	491,224	380,120	14,187	--	96,917	1,733,484	1,340,742	49,132	--	343,610
Pennington										
Softwoods	585,153	537,823	2,771	--	44,559	2,000,775	1,875,216	6,903	--	118,656
Hardwoods	3,656	3,180	28	--	448	3,373	2,529	48	--	796
All species	588,809	541,003	2,799	--	45,007	2,004,148	1,877,745	6,951	--	119,452
All counties										
Softwoods	1,626,769	1,344,984	78,807	--	202,978	5,596,927	4,690,628	269,801	--	636,498
Hardwoods	16,291	8,883	854	--	6,554	18,341	7,386	921	--	10,034
All species	1,643,060	1,353,867	79,661	--	209,532	5,615,268	4,698,014	270,722	--	646,532

[1]International 1/4-inch rule.

Table 5.--*Net volume of timber on commercial timberland by county, timber class, and softwoods and hardwoods; western South Dakota, 1977*

County	All timber classes			Growing stock			Sound cull trees			Rotten cull trees			Salvable dead trees		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
	Thousand cubic feet														
Butte, Harding, Meade	86,582	83,109	3,473	83,814	81,311	2,503	1,543	825	718	338	103	235	887	870	17
Custer	454,378	448,978	5,400	437,890	436,480	1,410	7,489	3,998	3,491	1,125	626	499	7,874	7,874	--
Fall River	42,380	42,172	208	41,323	41,217	106	680	593	87	35	20	15	342	342	--
Lawrence	512,599	495,269	17,330	491,224	482,608	8,616	11,314	4,456	6,858	2,619	776	1,843	7,442	7,429	13
Pennington	609,623	600,940	8,683	588,809	585,153	3,656	7,949	4,277	3,672	2,218	863	1,355	10,647	10,647	--
All counties	1,705,562	1,670,468	35,094	1,643,060	1,626,769	16,291	28,975	14,149	14,826	6,335	2,388	3,947	27,192	27,162	30

Table 6.--*Net volume of growing stock on commercial timberland by county, diameter class, and species; western South Dakota, 1977*

County and diameter class (inches)	SOFTWOODS			HARDWOODS			Total all species
	Ponderosa pine	White spruce	Total softwoods	Aspen	Other hardwoods	Total hardwoods	
	Thousand cubic feet						
Butte, Harding, Meade							
5.0 - 6.9	9,267	106	9,373	126	277	403	9,776
7.0 - 8.9	14,280	185	14,465	56	286	342	14,807
9.0 - 10.9	16,633	180	16,813	18	220	238	17,051
11.0 - 12.9	13,463	126	13,589	2	201	203	13,792
13.0 - 14.9	11,407	138	11,545	--	107	107	11,652
15.0 - 16.9	7,109	80	7,189	--	31	31	7,220
17.0 - 18.9	4,083	70	4,153	--	112	112	4,265
19.0 - 20.9	2,390	43	2,433	--	50	50	2,483
21.0 - 22.9	863	41	904	--	122	122	1,026
23.0 - 24.9	513	9	522	--	97	97	619
25.0 - 26.9	266	--	266	--	204	204	470
27.0 - 28.9	35	--	35	--	--	--	35
29.0+	24	--	24	--	594	594	618
Total	80,333	978	81,311	202	2,301	2,503	83,814

Table 6 (con.)

County and diameter class (inches)	SOFTWOODS			HARDWOODS			Total all species
	Ponderosa pine	White spruce	Total softwoods	Aspen	Other hardwoods	Total hardwoods	
	Thousand cubic feet						
Custer							
5.0 - 6.9	32,783	778	33,561	436	223	659	34,220
7.0 - 8.9	61,741	1,754	63,495	123	314	437	63,932
9.0 - 10.9	73,114	1,635	74,749	177	42	219	74,968
11.0 - 12.9	72,251	1,193	73,444	4	56	60	73,504
13.0 - 14.9	62,236	1,389	63,625	--	10	10	63,635
15.0 - 16.9	48,227	1,240	49,467	--	2	2	49,469
17.0 - 18.9	32,716	661	33,377	--	7	7	33,384
19.0 - 20.9	22,886	618	23,504	--	2	2	23,506
21.0 - 22.9	11,317	515	11,832	--	5	5	11,837
23.0 - 24.9	5,152	233	5,385	--	--	--	5,385
25.0 - 26.9	3,035	--	3,035	--	3	3	3,038
27.0 - 28.9	647	--	647	--	--	--	647
29.0+	359	--	359	--	6	6	365
Total	426,464	10,016	436,480	740	670	1,410	437,890

Table 6 (con.)

County and diameter class (inches)	SOFTWOODS			HARDWOODS			Total all species
	Ponderosa pine	White spruce	Total softwoods	Aspen	Other hardwoods	Total hardwoods	
	Thousand cubic feet						
Fall River							
5.0 - 6.9	4,048	27	4,075	25	4	29	4,104
7.0 - 8.9	7,350	124	7,474	3	7	10	7,484
9.0 - 10.9	8,287	104	8,391	6	23	29	8,420
11.0 - 12.9	6,626	77	6,703	--	1	1	6,704
13.0 - 14.9	5,823	48	5,871	--	([1])	([1])	5,871
15.0 - 16.9	3,962	64	4,026	--	--	--	4,026
17.0 - 18.9	2,338	19	2,357	--	--	--	2,357
19.0 - 20.9	1,230	20	1,250	--	--	--	1,250
21.0 - 22.9	526	39	565	--	--	--	565
23.0 - 24.9	284	9	293	--	--	--	293
25.0 - 26.9	92	--	92	--	37	37	129
27.0 - 28.9	69	--	69	--	--	--	69
29.0+	51	--	51	--	--	--	51
Total	40,686	531	41,217	34	72	106	41,323

[1]Less than 0.5 thousand cubic feet.

Table 6 (con.)

County and diameter class (inches)	SOFTWOODS: Ponderosa pine	SOFTWOODS: White spruce	SOFTWOODS: Total softwoods	HARDWOODS: Aspen	HARDWOODS: Other hardwoods	HARDWOODS: Total hardwoods	Total all species
	Thousand cubic feet						
Lawrence							
5.0 - 6.9	33,758	4,004	37,762	2,759	1,502	4,261	42,023
7.0 - 8.9	63,951	4,390	68,341	1,476	558	2,034	70,375
9.0 - 10.9	81,985	5,111	87,096	694	397	1,091	88,187
11.0 - 12.9	79,661	5,229	84,890	175	118	293	85,183
13.0 - 14.9	66,748	3,658	70,406	--	150	150	70,556
15.0 - 16.9	50,026	3,152	53,178	--	73	73	53,251
17.0 - 18.9	36,217	2,312	38,529	--	207	207	38,736
19.0 - 20.9	20,299	1,417	21,716	--	53	53	21,769
21.0 - 22.9	10,114	870	10,984	--	137	137	11,121
23.0 - 24.9	5,178	315	5,493	--	59	59	5,552
25.0 - 26.9	2,552	236	2,788	--	88	88	2,876
27.0 - 28.9	594	80	674	--	--	--	674
29.0+	751	--	751	--	170	170	921
Total	451,834	30,774	482,608	5,104	3,512	8,616	491,224

Table 6 (con.)

County and diameter class (inches)	SOFTWOODS			HARDWOODS			Total all species
	Ponderosa pine	White spruce	Total softwoods	Aspen	Other hardwoods	Total hardwoods	
	Thousand cubic feet						
Pennington							
5.0 - 6.9	46,578	1,886	48,464	1,230	349	1,579	50,043
7.0 - 8.9	85,439	2,712	88,151	618	283	901	89,052
9.0 - 10.9	101,920	2,999	104,919	352	192	544	105,463
11.0 - 12.9	99,076	2,861	101,937	101	91	192	102,129
13.0 - 14.9	80,431	2,712	83,143	--	26	26	83,169
15.0 - 16.9	60,249	2,473	62,722	--	40	40	62,762
17.0 - 18.9	41,149	1,493	42,642	--	85	85	42,727
19.0 - 20.9	26,412	1,116	27,528	--	72	72	27,600
21.0 - 22.9	13,234	672	13,906	--	75	75	13,981
23.0 - 24.9	6,394	308	6,702	--	--	--	6,702
25.0 - 26.9	3,678	--	3,678	--	48	48	3,726
27.0 - 28.9	835	--	835	--	--	--	835
29.0+	526	--	526	--	94	94	620
Total	565,921	19,232	585,153	2,301	1,355	3,656	588,809

Table 6 (con.)

County and diameter class (inches)	SOFTWOODS			HARDWOODS			Total all species
	Ponderosa pine	White spruce	Total softwoods	Aspen	Other hardwoods	Total hardwoods	
	Thousand cubic feet						
All counties							
5.0 - 6.9	126,434	6,801	133,235	4,576	2,355	6,931	140,166
7.0 - 8.9	232,761	9,165	241,926	2,276	1,448	3,724	245,650
9.0 - 10.9	281,939	10,029	291,968	1,247	874	2,121	294,089
11.0 - 12.9	271,077	9,486	280,563	282	467	749	281,312
13.0 - 14.9	226,645	7,945	234,590	--	293	293	234,883
15.0 - 16.9	169,573	7,009	176,582	--	146	146	176,728
17.0 - 18.9	116,503	4,555	121,058	--	411	411	121,469
19.0 - 20.9	73,217	3,214	76,431	--	177	177	76,608
21.0 - 22.9	36,054	2,137	38,191	--	339	339	38,530
23.0 - 24.9	17,521	874	18,395	--	156	156	18,551
25.0 - 26.9	9,623	236	9,859	--	380	380	10,239
27.0 - 28.9	2,180	80	2,260	--	--	--	2,260
29.0+	1,711	--	1,711	--	864	864	2,575
Total	1,565,238	61,531	1,626,769	8,381	7,910	16,291	1,643,060

Table 7.--*Net volume of sawtimber on commercial timberland by county, diameter class, and species; western South Dakota, 1977*

County and diameter class (inches)	SOFTWOODS			HARDWOODS			Total all species
	Ponderosa pine	White spruce	Total softwoods	Aspen	Other hardwoods	Total hardwoods	
	Thousand board feet, International 1/4-inch rule						
Butte, Harding, Meade							
9.0 - 10.9	41,237	1,011	42,248	0	0	0	42,248
11.0 - 12.9	54,389	733	55,122	13	962	975	56,097
13.0 - 14.9	56,377	817	57,194	--	527	527	57,721
15.0 - 16.9	38,374	477	38,851	--	155	155	39,006
17.0 - 18.9	23,563	420	23,983	--	566	566	24,549
19.0 - 20.9	14,430	260	14,690	--	244	244	14,934
21.0 - 22.9	4,826	250	5,076	--	603	603	5,679
23.0 - 24.9	2,985	59	3,044	--	477	477	3,521
25.0 - 26.9	1,546	--	1,546	--	1,041	1,041	2,587
27.0 - 28.9	199	--	199	--	--	--	199
29.0+	139	--	139	--	3,140	3,140	3,279
Total	238,065	4,027	242,092	13	7,715	7,728	249,820

Table 7 (con.)

County and diameter class (inches)	SOFTWOODS			HARDWOODS			Total all species
	Ponderosa pine	White spruce	Total softwoods	Aspen	Other hardwoods	Total hardwoods	
	Thousand board feet, International 1/4-inch rule						
Custer							
9.0 - 10.9	181,160	9,208	190,368	0	0	0	190,368
11.0 - 12.9	290,656	6,927	297,583	18	275	293	297,876
13.0 - 14.9	298,373	8,229	306,602	--	54	54	306,656
15.0 - 16.9	255,308	7,405	262,713	--	14	14	262,727
17.0 - 18.9	184,986	3,964	188,950	--	40	40	188,990
19.0 - 20.9	134,845	3,726	138,571	--	10	10	138,581
21.0 - 22.9	62,576	3,167	65,743	--	24	24	65,767
23.0 - 24.9	28,960	1,470	30,430	--	--	--	30,430
25.0 - 26.9	17,242	--	17,242	--	17	17	17,259
27.0 - 28.9	3,721	--	3,721	--	--	--	3,721
29.0+	2,196	--	2,196	--	34	34	2,230
Total	1,460,023	44,096	1,504,119	18	468	486	1,504,605

Table 7 (con.)

County and diameter class (inches)	SOFTWOODS			HARDWOODS			Total all species
	Ponderosa pine	White spruce	Total softwoods	Aspen	Other hardwoods	Total hardwoods	
	Thousand board feet, International 1/4-inch rule						
Fall River							
9.0 - 10.9	18,378	583	18,961	0	0	0	18,961
11.0 - 12.9	25,890	442	26,332	--	7	7	26,339
13.0 - 14.9	28,359	284	28,643	--	2	2	28,645
15.0 - 16.9	21,312	384	21,696	--	--	--	21,696
17.0 - 18.9	13,405	118	13,523	--	--	--	13,523
19.0 - 20.9	7,391	121	7,512	--	--	--	7,512
21.0 - 22.9	3,015	235	3,250	--	--	--	3,250
23.0 - 24.9	1,711	57	1,768	--	--	--	1,768
25.0 - 26.9	520	--	520	--	197	197	717
27.0 - 28.9	451	--	451	--	--	--	451
29.0+	349	--	349	--	--	--	349
Total	120,781	2,224	123,005	--	206	206	123,211

Table 7 (con.)

County and diameter class (inches)	SOFTWOODS			HARDWOODS			Total all species
	Ponderosa pine	White spruce	Total softwoods	Aspen	Other hardwoods	Total hardwoods	
	Thousand board feet, International 1/4-inch rule						
Lawrence							
9.0 - 10.9	217,980	25,455	243,435	0	0	0	243,435
11.0 - 12.9	340,262	29,223	369,485	922	577	1,499	370,984
13.0 - 14.9	331,486	20,612	352,098	--	766	766	352,864
15.0 - 16.9	272,078	18,210	290,288	--	395	395	290,683
17.0 - 18.9	210,598	13,040	223,638	--	1,128	1,128	224,766
19.0 - 20.9	122,182	8,045	130,227	--	293	293	130,520
21.0 - 22.9	56,878	5,009	61,887	--	700	700	62,587
23.0 - 24.9	29,725	1,928	31,653	--	317	317	31,970
25.0 - 26.9	14,443	1,294	15,737	--	468	468	16,205
27.0 - 28.9	3,456	451	3,907	--	--	--	3,907
29.0+	4,581	--	4,581	--	982	982	5,563
Total	1,603,669	123,267	1,726,936	922	5,626	6,548	1,733,484

Table 7 (con.)

County and diameter class (inches)	SOFTWOODS			HARDWOODS			Total all species
	Ponderosa pine	White spruce	Total softwoods	Aspen	Other hardwoods	Total hardwoods	
	Thousand board feet, International 1/4-inch rule						
Pennington							
9.0 - 10.9	262,438	16,786	279,224	0	0	0	279,224
11.0 - 12.9	409,348	16,475	425,823	506	475	981	426,804
13.0 - 14.9	389,852	15,895	405,747	--	137	137	405,884
15.0 - 16.9	322,885	14,650	337,535	--	217	217	337,752
17.0 - 18.9	235,691	8,910	244,601	--	471	471	245,072
19.0 - 20.9	157,717	6,642	164,359	--	385	385	164,744
21.0 - 22.9	72,911	4,141	77,052	--	384	384	77,436
23.0 - 24.9	35,849	1,945	37,794	--	--	--	37,794
25.0 - 26.9	20,770	--	20,770	--	258	258	21,028
27.0 - 28.9	4,799	--	4,799	--	--	--	4,799
29.0+	3,071	--	3,071	--	540	540	3,611
Total	1,915,331	85,444	2,000,775	506	2,867	3,373	2,004,148

Table 7 (con.)

County and diameter class (inches)	SOFTWOODS			HARDWOODS			Total all species
	Ponderosa pine	White spruce	Total softwoods	Aspen	Other hardwoods	Total hardwoods	
	Thousand board feet, International 1/4-inch rule						
All counties							
9.0 - 10.9	721,193	53,043	774,236	0	0	0	774,236
11.0 - 12.9	1,120,545	53,800	1,174,345	1,459	2,296	3,755	1,178,100
13.0 - 14.9	1,104,447	45,837	1,150,284	--	1,486	1,486	1,151,770
15.0 - 16.9	909,957	41,126	951,083	--	781	781	951,864
17.0 - 18.9	668,243	26,452	694,695	--	2,205	2,205	696,900
19.0 - 20.9	436,565	18,794	455,359	--	932	932	456,291
21.0 - 22.9	200,206	12,802	213,008	--	1,711	1,711	214,719
23.0 - 24.9	99,230	5,459	104,689	--	794	794	105,483
25.0 - 26.9	54,521	1,294	55,815	--	1,981	1,981	57,796
27.0 - 28.9	12,626	451	13,077	--	--	--	13,077
29.0+	10,336	--	10,336	--	4,696	4,696	15,032
Total	5,337,869	259,058	5,596,927	1,459	16,882	18,341	5,615,268

Table 8.--*Net annual growth of growing stock and sawtimber on commercial timberland by county, softwoods and hardwoods, and owner group; western South Dakota, 1977*

County	All owner groups	National Forest	Other public	Forest industry	Other private	All owner groups	National Forest	Other public	Forest industry	Other private
	Thousand cubic feet					*Thousand board feet*[1]				
Butte, Harding, Meade										
Softwoods	2,509	1,312	191	--	1,006	9,853	5,211	714	--	3,928
Hardwoods	102	20	13	--	69	116	11	9	--	96
All species	2,611	1,332	204	--	1,075	9,969	5,222	723	--	4,024
Custer										
Softwoods	10,067	8,063	1,142	--	862	40,531	33,988	3,850	--	2,693
Hardwoods	125	96	2	--	27	188	185	([2])	--	3
All species	10,192	8,159	1,144	--	889	40,719	34,173	3,850	--	2,696
Fall River										
Softwoods	1,190	603	58	--	529	4,130	2,429	174	--	1,527
Hardwoods	5	4	([3])	--	1	9	7	([2])	--	2
All species	1,195	607	58	--	530	4,139	2,436	174	--	1,529
Lawrence										
Softwoods	11,408	8,422	389	--	2,597	54,704	39,689	1,943	--	13,072
Hardwoods	670	314	50	--	306	555	178	59	--	318
All species	12,078	8,736	439	--	2,903	55,259	39,867	2,002	--	13,390
Pennington										
Softwoods	13,530	12,063	90	--	1,377	58,400	53,061	290	--	5,049
Hardwoods	353	242	9	--	102	395	233	9	--	153
All species	13,883	12,305	99	--	1,479	58,795	53,294	299	--	5,202
All counties										
Softwoods	38,704	30,463	1,870	--	6,371	167,618	134,378	6,971	--	26,269
Hardwoods	1,255	676	74	--	505	1,263	614	77	--	572
All species	39,959	31,139	1,944	--	6,876	168,881	134,992	7,048	--	26,841

[1]International 1/4-inch rule.

[2]Less than 0.5 thousand bd. ft.

[3]Less than 0.5 thousand ft^3.

Table 9.--*Annual mortality of growing stock and sawtimber on commercial timberland by county, softwoods and hardwoods, and owner group; western South Dakota, 1977*

County	All owner groups	National Forest	Other public	Forest industry	Other private	All owner groups	National Forest	Other public	Forest industry	Other private
	Thousand cubic feet					*Thousand board feet*[1]				
Butte, Harding, Meade										
Softwoods	164	138	2	--	24	659	569	7	--	83
Hardwoods	5	--	([2])	--	5	26	--	1	--	25
All species	169	138	--	--	29	685	569	8	--	108
Custer										
Softwoods	1,063	950	104	--	9	4,669	4,154	486	--	29
Hardwoods	--	--	--	--	--	--	--	--	--	--
All species	1,063	950	104	--	9	4,669	4,154	486	--	29
Fall River										
Softwoods	52	39	1	--	12	221	162	6	--	53
Hardwoods	--	--	--	--	--	--	--	--	--	--
All species	52	39	1	--	12	221	162	6	--	53
Lawrence										
Softwoods	1,089	962	15	--	112	4,872	4,350	59	--	463
Hardwoods	4	--	1	--	3	--	--	--	--	--
All species	1,093	962	16	--	115	4,872	4,350	59	--	463
Pennington										
Softwoods	1,414	1,402	1	--	11	6,198	6,183	([3])	--	15
Hardwoods	--	--	--	--	--	-	--	--	--	--
All species	1,414	1,402	1	--	11	6,198	6,183	([3])	--	15
All counties										
Softwoods	3,782	3,491	123	--	168	16,619	15,418	558	--	643
Hardwoods	9	--	1	--	8	26	--	1	--	25
All species	3,791	3,491	124	--	176	16,645	15,418	559	--	668

[1]International 1/4-inch rule.

[2]Less than 0.5 thousand ft^3.

[3]Less than 0.5 thousand bd. ft.

Table 10.--*Projected output of roundwood projects from timberlands by county, softwoods and hardwoods, and owner group; western South Dakota, 1977*

County	All owner groups	National Forest	Other public	Forest industry	Other private
			Thousand cubic feet		
Butte, Harding, Meade					
Softwoods	1,076	672	1	--	403
Hardwoods	--	--	--	--	--
All species	1,076	672	1	--	403
Custer					
Softwoods	3,451	2,982	85	--	384
Hardwoods	--	--	--	--	--
All species	3,451	2,982	85	--	384
Fall River					
Softwoods	--	--	--	--	--
Hardwoods	--	--	--	--	--
All species	--	--	--	--	--
Lawrence					
Softwoods	10,329	7,085	81	--	3,163
Hardwoods	--	--	--	--	--
All species	10,329	7,085	81	--	3,163
Pennington					
Softwoods	4,800	3,922	49	--	829
Hardwoods	--	--	--	--	--
All species	4,800	3,922	49	--	829
All counties					
Softwoods	19,656	14,661	216	--	4,779
Hardwoods	--	--	--	--	--
All species	19,656	14,661	216	--	4,779

Table 11.--*Projected removals from growing stock and sawtimber on commercial timberland by county, roundwood products, logging residues, and other removals; western South Dakota, 1977*

County	Total removals	All products	Sawlogs	Veneer logs	Pulpwood	Commercial poles	Mine timbers	Miscellaneous industrial wood	Posts, fuelwood, miscellaneous farm timbers	Logging residues	Other removals
	Thousand cubic feet										
Butte, Harding, Meade	1,113	1,055	714	--	259	9	--	--	73	45	13
Custer	3,578	3,403	2,289	--	455	156	--	--	503	133	42
Fall River	--	--	--	--	--	--	--	--	--	--	--
Lawrence	10,754	10,204	6,588	--	2,518	278	--	--	820	423	127
Pennington	4,965	4,707	3,394	--	868	116	--	--	329	200	58
All counties	20,410	19,369	12,985	--	4,100	559	--	--	1,725	801	240
	Thousand board feet, International 1/4-inch rule										
Butte, Harding, Meade	6,451	6,315	4,511	--	1,475	45	--	--	284	58	78
Custer	20,154	19,738	14,470	--	2,583	727	--	--	1,958	172	244
Fall River	--	--	--	--	--	--	--	--	--	--	--
Lawrence	61,746	60,456	41,655	--	14,315	1,294	--	--	3,192	542	748
Pennington	28,822	28,215	21,457	--	4,935	542	--	--	1,281	258	349
All counties	117,173	114,724	82,093	--	23,308	2,608	--	--	6,715	1,030	1,419

Green, Alan W.
1978. Timber resources of western South Dakota. USDA For. Serv. Resour. Bull. INT-12, 56 p. Intermt. For. and Range Exp. Stn., Ogden, Utah 84401.

Reports findings of the comprehensive survey of western South Dakota's 1.4 million acres of forests, which include 1.2 million acres of commercial forest land. Presents statistics on area, volume, growth, mortality, and timber use. Also describes species, volumes per acre, stocking, site quality, ownership, trends in product harvesting and other factors that bear on timber management. Opportunities and problems related to future development are discussed.

KEYWORDS: timber supplies, forest land, statistics.

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